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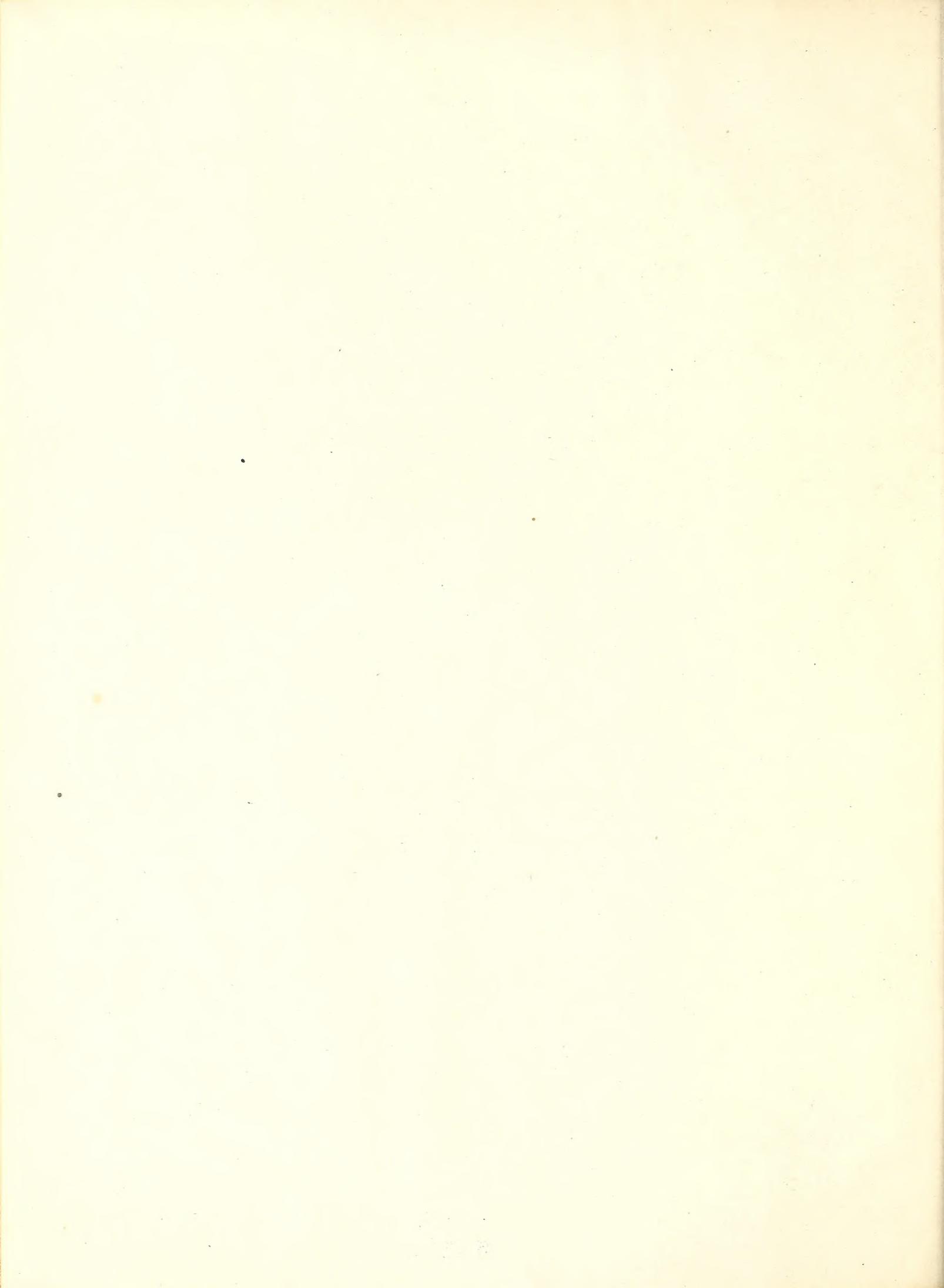






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SOUTHERN GOOD ROADS

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Touring Yellowstone Park on Government Highways

By HON. MAURICE O. ELDRIDGE, Assistant Chief, Division of Road Management
United States Office of Public Roads

(By Permission of *The World To-Day*)

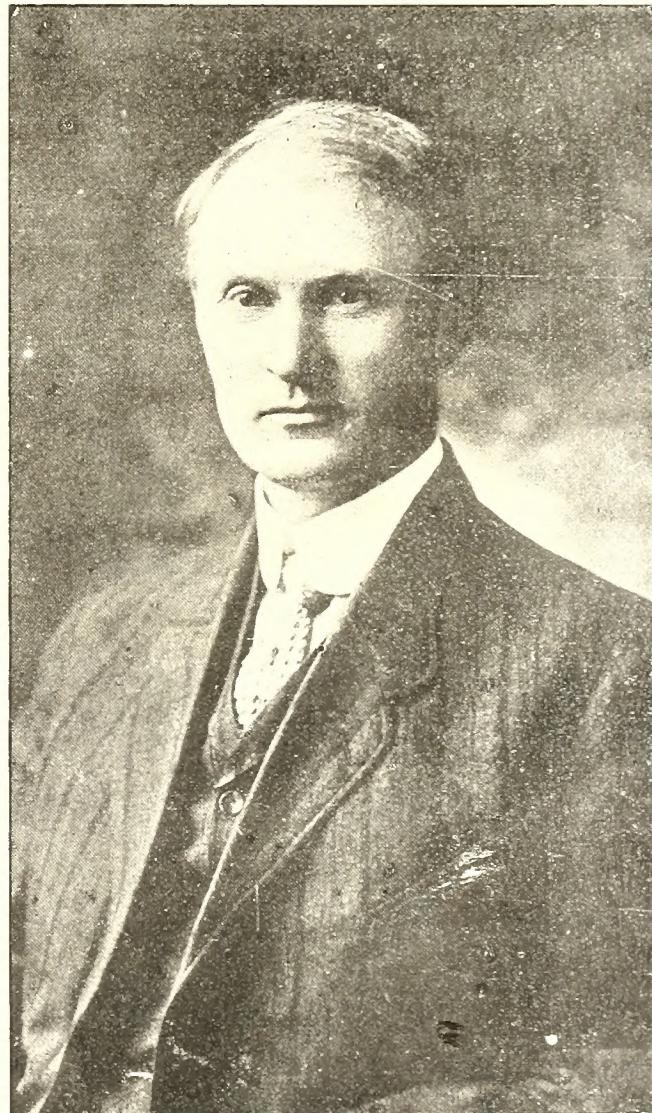
The magnificent highways which the United States Government has built through the Yellowstone Park rival in interest the scenic attractions and geological wonders of that region. They constitute the finest system of scenic highways in the United States and in some respects excel the mountain roads of the oldest monarchies of Europe. The Yellowstone region is, however, so replete with nature's wonders that the magnitude of this splendid system of roads is not fully appreciated by all who travel over them.

There are 416 miles of government roads in the Yellowstone Park and the adjacent national forests. In addition to the Belt Line System, which is 158 miles long, there are seventy-nine miles of approaches in the forest reserves. There are also seventy-four miles of side roads to isolated objects of interest.

In addition to this there are 150 miles of horseback trails in the park. These are built for the benefit of travellers who prefer the less frequented roads, and also for scouts who patrol the park to protect the game, the forests and the formations. Four troops of cavalry are employed for this purpose.

Although the Yellowstone region was first discovered about 1804-5, by John Colter, of the Lewis and Clark expedition, it was not until about 1870 that its wonders were thoroughly explored and disclosed to the world. In 1872 a bill setting apart the region as a public park "for the benefit and enjoyment of the people" was passed by congress. The first appropriation to build roads passed congress in 1877 and amounted to \$15,000. Previous to this time the Yellowstone region was a howling wilderness. During the years 1878-1882 congress appropriated \$70,000 for park roads, and from 1883 to 1902 the annual appropriation amounted to \$40,000. The first appropriations were used largely to build horseback trails and crude wagon roads.

In 1902 congress pledged the sum of \$750,000 for the three years following with which to build first-class roads and bridges. Up to June 30, 1909, \$1,850,426.45 had been expended for this purpose, and of this \$1,077,669.17 was the cost of permanent work. The Mount Washburn road, including the road around Mount Washburn through Dunraven Pass from the Canon Hotel to Tower Falls, cost \$725,757.50, or \$5,239.89 per mile, a very reasonable rate for that class of work.



HON. MAURICE O. ELDRIDGE

The road system of the park is designed to provide entrances from points north, east, south and west, and to make all the principal objects of interest easily accessible to visitors.

The Mammoth Hot Springs, Firehole, Geyser Basin and the Upper Geyser Basin are about twenty miles apart and are located in the western portion of the park. The lake, the canon and Tower Falls are similarly situated about twenty miles east of these points. The natural line of travel, therefore, for those entering the park from the north at Gardiner, Montana, is to pass along the first line to the Upper Basin, across to the second line at the lake, and back to Gardiner by way of the canon and Tower Falls. The road connecting these various points of interest is usually referred to as the Belt Line System.

The northern approach extends from Gardiner, Montana, where the Northern Pacific railroad touches the park, to Mammoth Hot Springs, a distance of five miles. The eastern approach is about sixty miles long, thirty-one miles of which lie in the park. It connects with the Burlington railroad and extends from the Valley of the Shoshone River through Sylvan Pass in the Absaroka Range to the Belt Line near the Lake Hotel. The southern approach has no railroad connection and with its course through the forest reserve is about 110 miles long. It extends from the famous valley of Jackson's Hole, at the base of the Teton Mountains, up the Valley of the Snake River to Lewis' Lake, and across the Continental Divide to the Belt Line on the western shore of the Yellowstone Lake. The western approach, which connects with the Union Pacific, is about twenty miles long and extends from the edge of the park on the Madison River, up the Madison, to its tributaries, the Gibbon and Firehole Rivers, where it forks, and each branch extends to the Belt Line System.

In making the customary tour of the park, the visitor will travel about 150 miles and make the trip in from five to six days. There are no railroads or trolley lines, and automobiles are not permitted on the

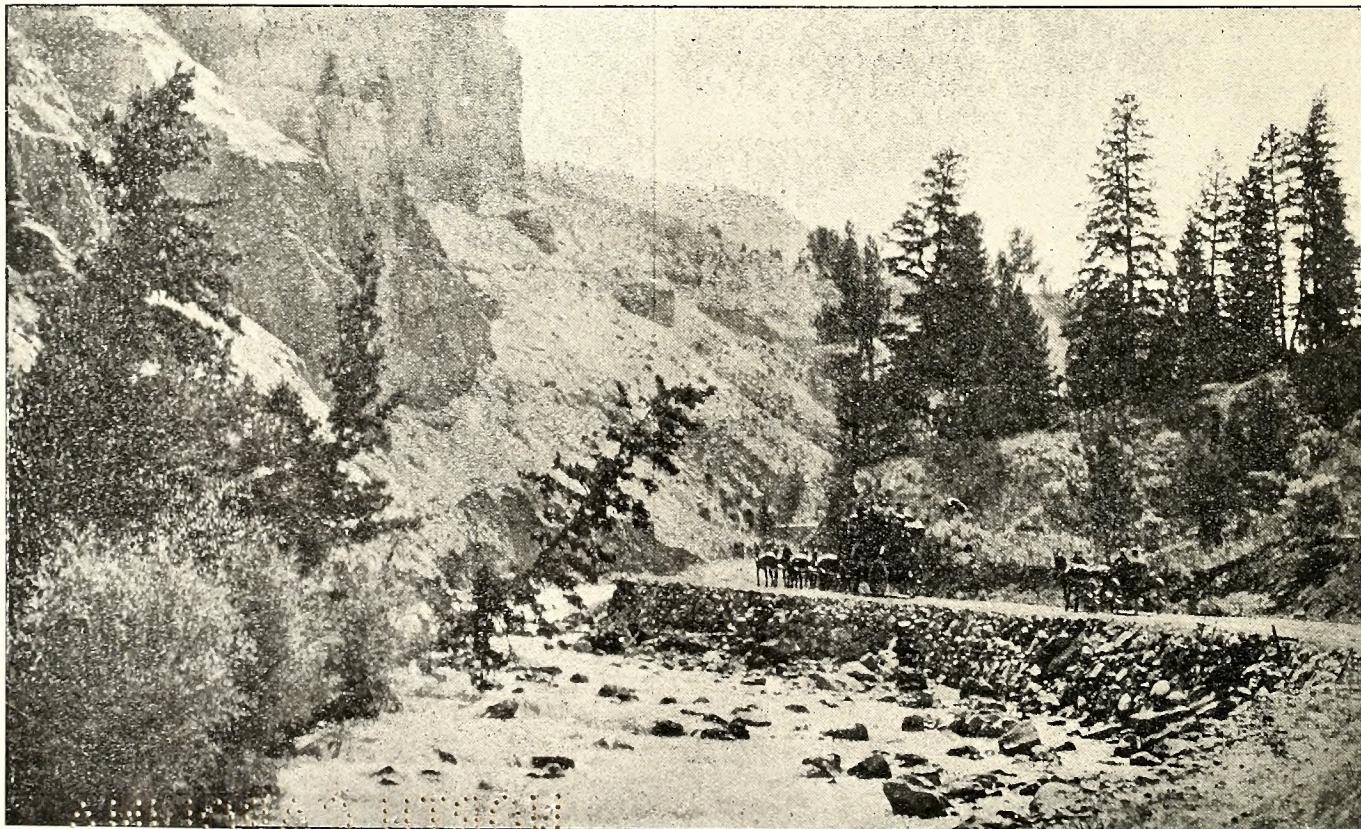
park roads. The tourists usually go in stage coaches, drawn by from four to six horses, although many visitors make the trip in buggies, surreys, or wagons, or on horseback.

All supplies are hauled into the park over the wagons on roads. The extent of the traffic on the roads may be appreciated when it is known that during the season of 1909 (June 5 to September 25), 32,545 tourists made the trip through the park, an average of 325 per day. To accommodate this traffic, nearly 700 coaches, surreys and spring-wagons were used in addition to the wagons employed in carrying express, baggage and freight. The horses employed last season in hauling the passengers and freight numbered 1,372.

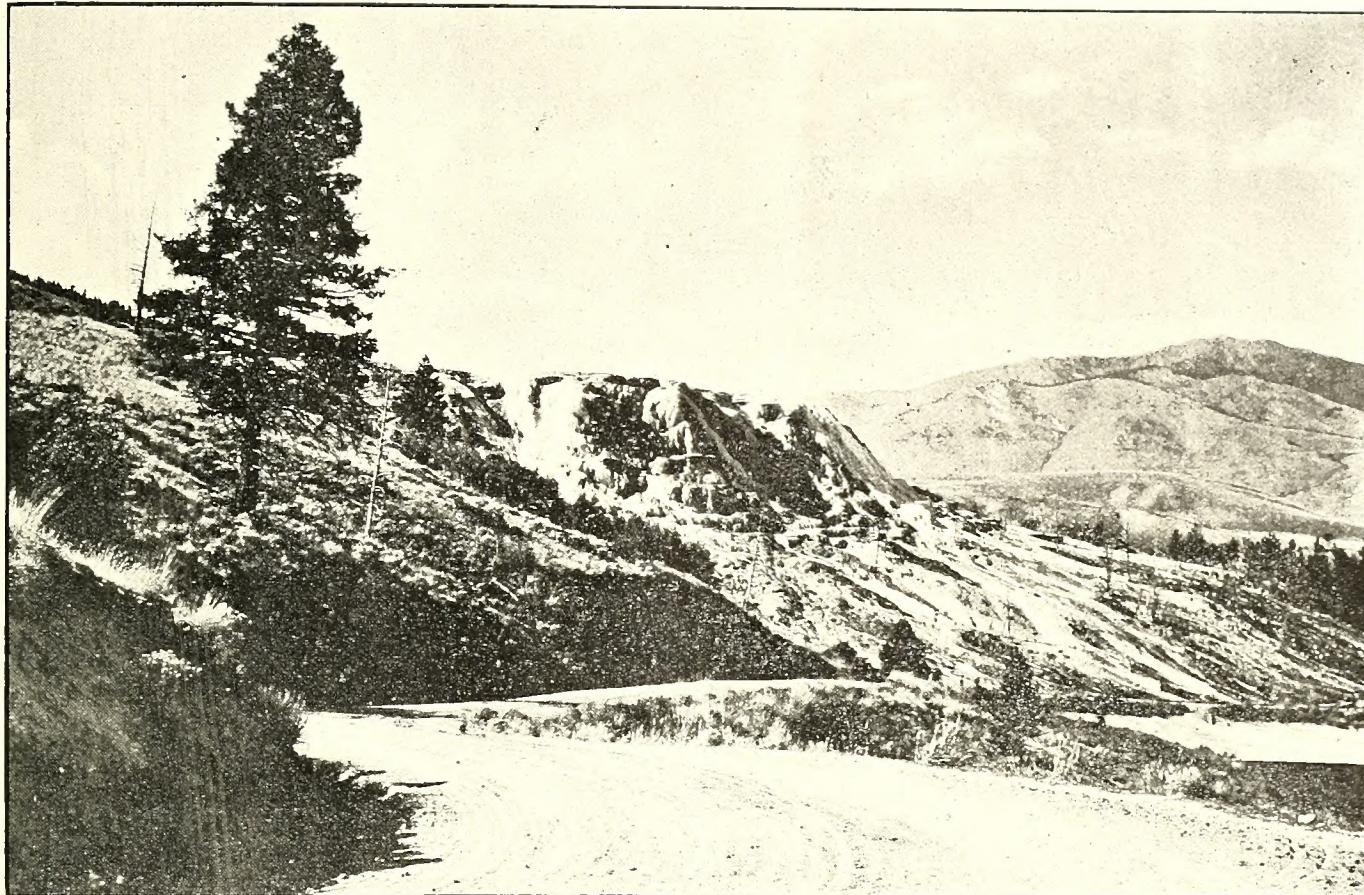
The roads are so located as to lead to the most important centers of attraction, and, at the same time, to give the finest views of the surrounding country. They are built to harmonize, as nearly as possible, with their surroundings, so that the construction of the roads themselves is a matter of interest to the traveling public.

The grades are limited to eight feet in one hundred, but this limit is reached only in a few places. It has been found from experience that, for tourist traffic, an eight per cent grade serves the purpose as well as a five per cent grade, for when the grade exceeds four or five per cent, a loaded coach can not be drawn at a trot for any considerable distance; but when the speed is reduced to a walk, a team will ascend an eight per cent grade almost as rapidly as one of five per cent. Moreover, by the use of an eight per cent grade, the top of a hill may be reached in a shorter distance.

All vehicles are provided with brakes, and the horses are so trained that an eight per cent grade may be safely descended at a rapid trot. Level stretches are introduced on long grades, so as to rest the drivers



GARDINER CANON



THE ROAD AT THE FOOT OF THE MAMMOTH HOT SPRINGS

The Yellowstone region was once the center of tremendous volcanic activity that still manifests itself in the form of geysers and hot springs

and horses in ascending or descending. The curves are carefully plotted so as to protect travelers and add to the beauty of the roads. As a general rule, these curves have a radius of more than one hundred feet, but in a few places a radius of only fifty feet has been found necessary.

The rights of way are cleared of timber and other obstructions to a width of thirty feet, and the surface of the traveled roads is eighteen feet wide with six feet on either side for slopes and ditches. Now that the groundwork of this great system of roads is completed, it is the ultimate intention of those in charge to clear away the dead and decaying timber to a width of at least one hundred feet and to beautify the roadsides with grass and shrubbery, thus enabling visitors to obtain better views of the wild game which abounds throughout the park.

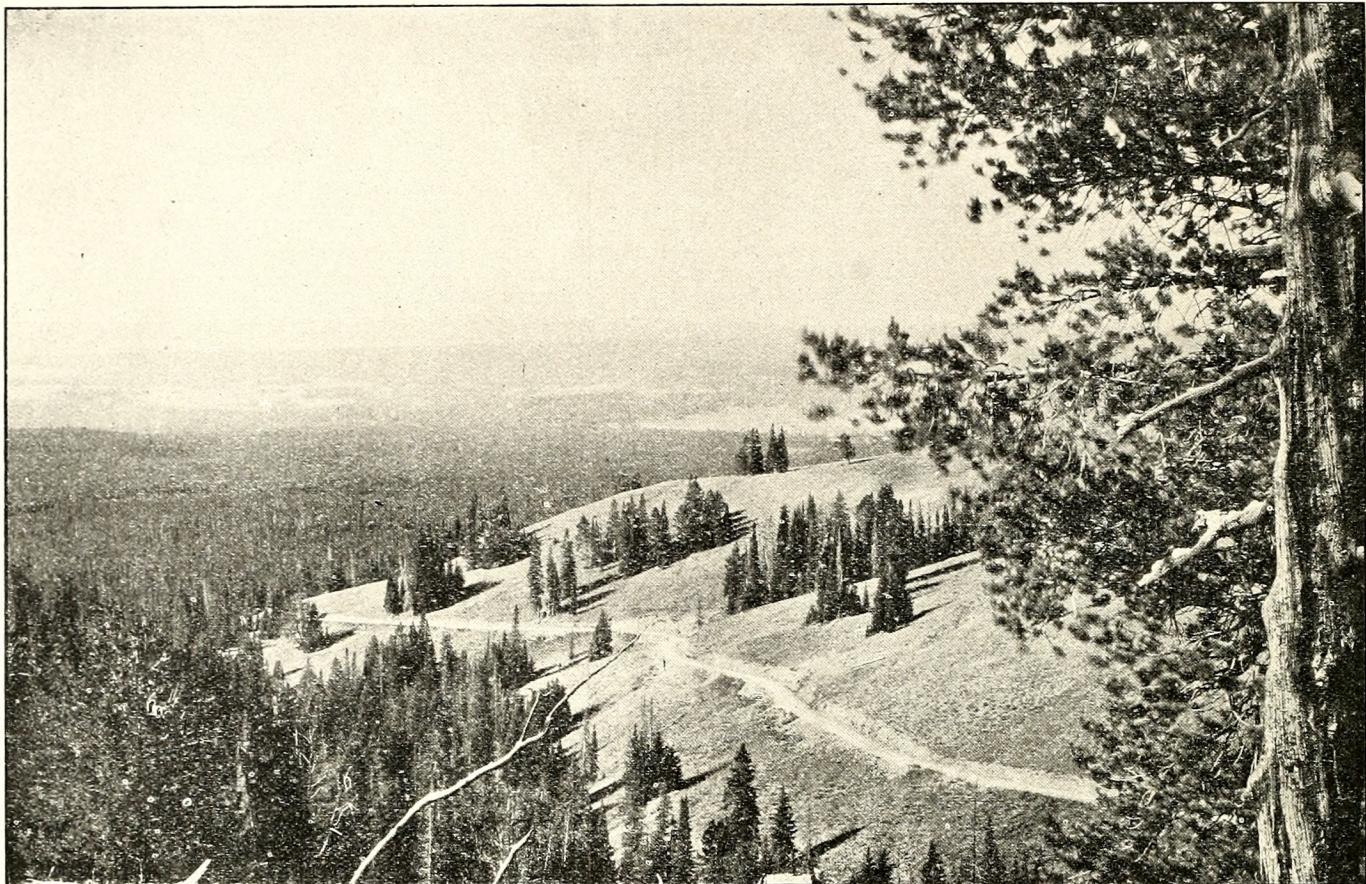
The drainage of these roads is a difficult problem. The higher portions of the park are covered in winter with several feet of snow, and the spring rains are as heavy as on the Atlantic coast. Many of the streams become raging torrents and it has been necessary to build over sixty bridges and five hundred culverts. The absence of rain in the summer and fall is almost as disastrous to the roads as its abundance in the spring, for the long dry season always produces dusty roads. The traffic is so heavy and the dust is so disagreeable that it has been found necessary to keep the Belt Line roads sprinkled constantly during the tourist season. In 1908 thirty-five four-horse sprinklers were in operation during the height of the season. Supply tanks or reservoirs are provided along the roads at frequent intervals and are filled by gravity or hydraulic rams.

The Yellowstone region was the center of tremendous volcanic activity at a comparatively late geological period. This activity still manifests itself in the form of geysers, hot springs, deeply eroded canons, crater formations, cliffs of obsidian, sulphur mountains, petrified forests and beds of lava piled up to a depth of two thousand feet and more. Consequently, there is a great variety of rocks and soils in the park. Some of this material is suitable for road building, but much of it is too friable to resist wear. The rocks vary from the hardest and toughest of basalt to the most brittle rhyolites or obsidian and the softer geyser formations.

Vast fields of ice and snow which covered many parts of the Yellowstone region during the glacial epoch deposited boulders and drift in many of the valleys in great abundance. Some of this glacial drift is suitable for road building, but it is not well distributed. Great masses of stone, broken by rapid cooling into small fragments, are found in places, but these deposits are limited in number and some of them are poor in quality.

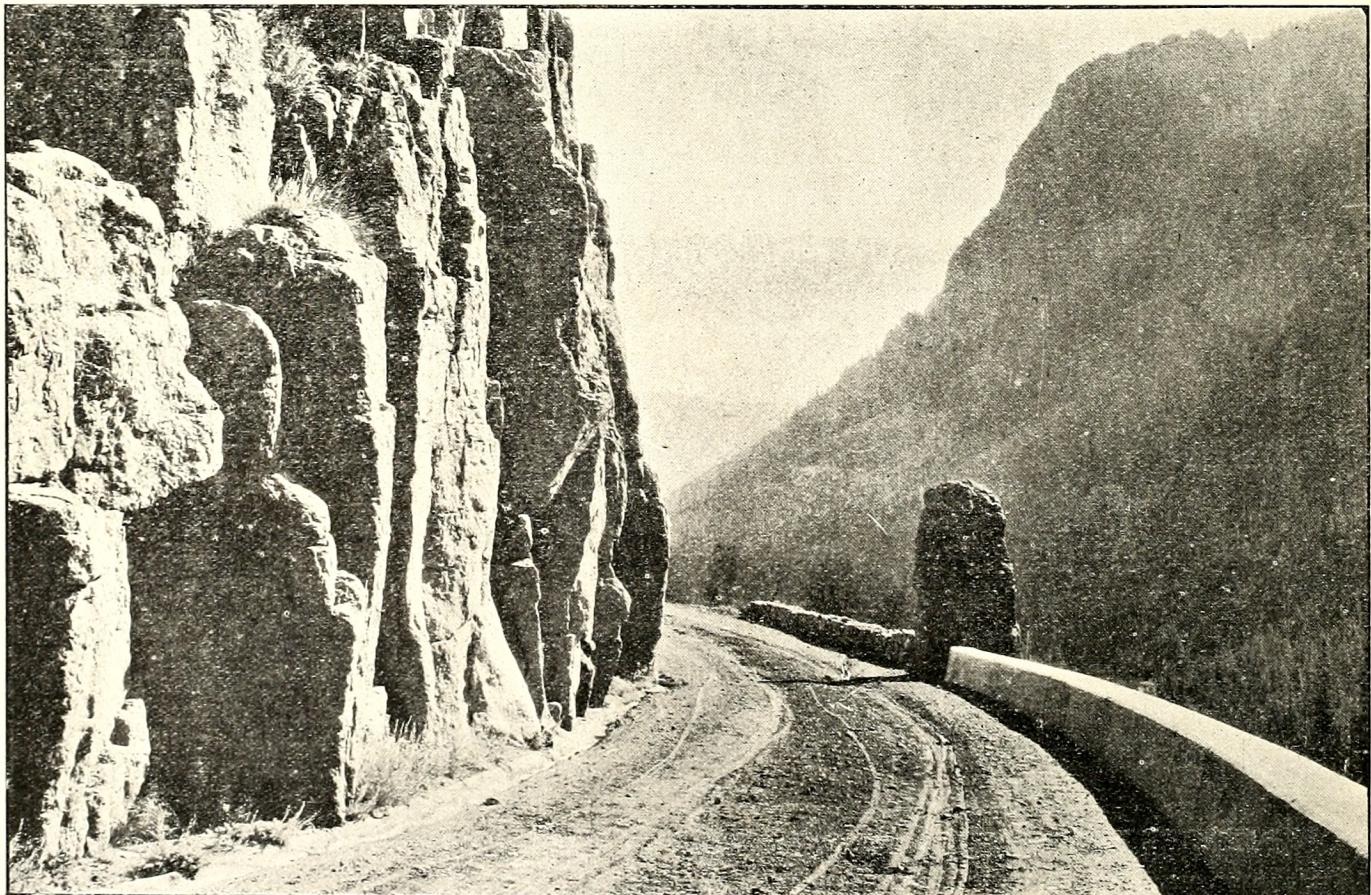
The roads are surfaced with the best material available, whether it be broken stone, glacial gravel, or selected soil. The poorer sections of road are being surfaced as fast as the funds will permit.

From 1883 to the present time, the construction and maintenance of the roads has been under the direction of an officer of the Engineer Corps of the United States army. Captain H. M. Chittenden, recently retired as lieutenant-colonel, was for many years the army engineer in charge of this work, and to him is due the credit of designing and building most of the Belt Line



THE ROAD TO MOUNT WASHBURN

It runs along mountainsides carpeted with grassy plats and covered with flowers. Isolated groves of fir and spruce give it the appearance of a park



THE MONOLITH AT THE GOLDEN GATE VIADUCT

One of the picturesque landmarks of the old road, although it stood higher up on the wall of the canon. The difficulty of moving it to the new position may be appreciated when it is known that it weighs twenty-three tons

System and the approaches to it, as well as that masterpiece of highway engineering, the Mount Washburn road; and also the concrete viaduct through the Golden Gate Canon, the concrete bridge over the Yellowstone River, and the gigantic masonry arch, which forms the entrance to the park at Gardiner, Montana. Captain W. Willing, Colonel Chittenden's successor, is devoting himself to bringing the work, so well started, to a high standard of construction and maintenance.

The great arch at Gardiner is built of the hardest and toughest basaltic rock. Ex-President Roosevelt laid the cornerstone of this magnificent structure. An inscription—"For the enjoyment and benefit of the people"—is carved in bold letters high up on the northern facade of this great gateway. The inscription is copied from the act of congress creating the park.

Just before entering the Golden Gate Canon, the Belt Line road passes through the Travertine Rocks, sometimes referred to as the Silver Gate. This is one of the most beautiful sections of road in the park, and one which was the most difficult to build. Here huge boulders left by some great convulsion of nature cover the mountainside, and vary in size from a box-car to an eight-room house.

The viaduct, which carries the road along the western wall of the Golden Gate Canon, is the most notable engineering feature of the whole road system. It cost \$10,000 and was built to take the place of the old wooden structure which had survived its usefulness. This viaduct consists of eleven reinforced concrete arches resting on two abutments and ten piers of the same material, while the whole is on an eight per cent grade

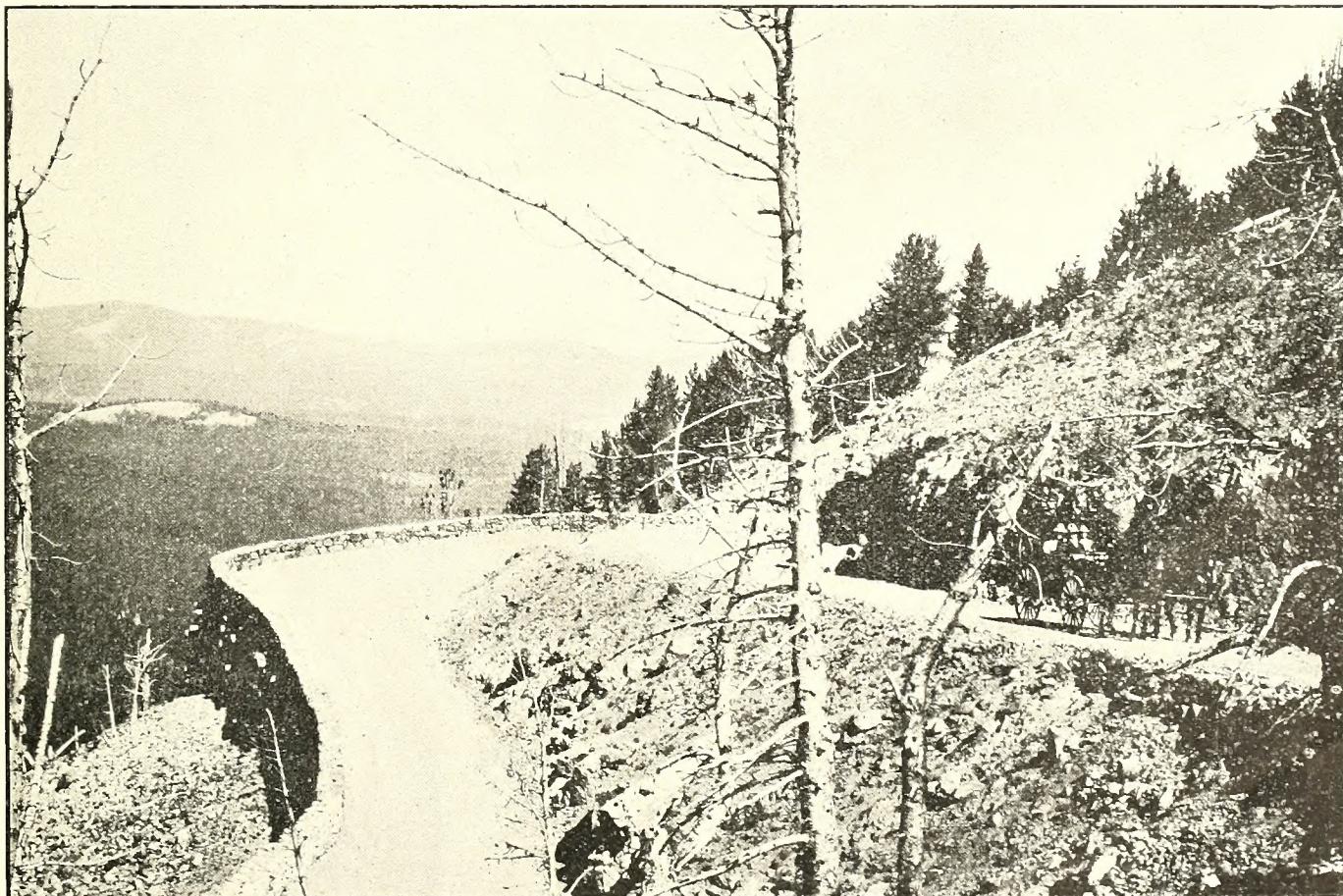
and on a ten-degree curve. The viaduct is about 220 feet long and the roadway averages ten feet in width.

An interesting feature of this work was the removal of a large rock which almost blocked the entrance of the old road. As this great rock formed one of the picturesque landmarks at the entrance of the Golden Gate, it was decided to break it from its moorings, move it out and raise it to the grade of the new road. It was placed on a concrete column three feet in diameter and twenty-four feet in height, around which was built a mound of earth and stone to conceal the artificial nature of the foundation. The difficulties of this task may be appreciated when it is known that this great monolith weighs twenty-three tons, and that its removal took place high up on the wall of the canon.

Another interesting feature of the Belt Line road is the obsidian cliff about twelve miles from Mammoth Hot Springs. The cliff is composed of black volcanic glass, and this material is so hard that in constructing the road around the base of the cliff, it became necessary to build great bonfires to heat the glassy rocks, after which cold water was thrown upon them to break them into fragments. From this mass of broken glass the road was built, and consequently received the name, "The Glass Road."

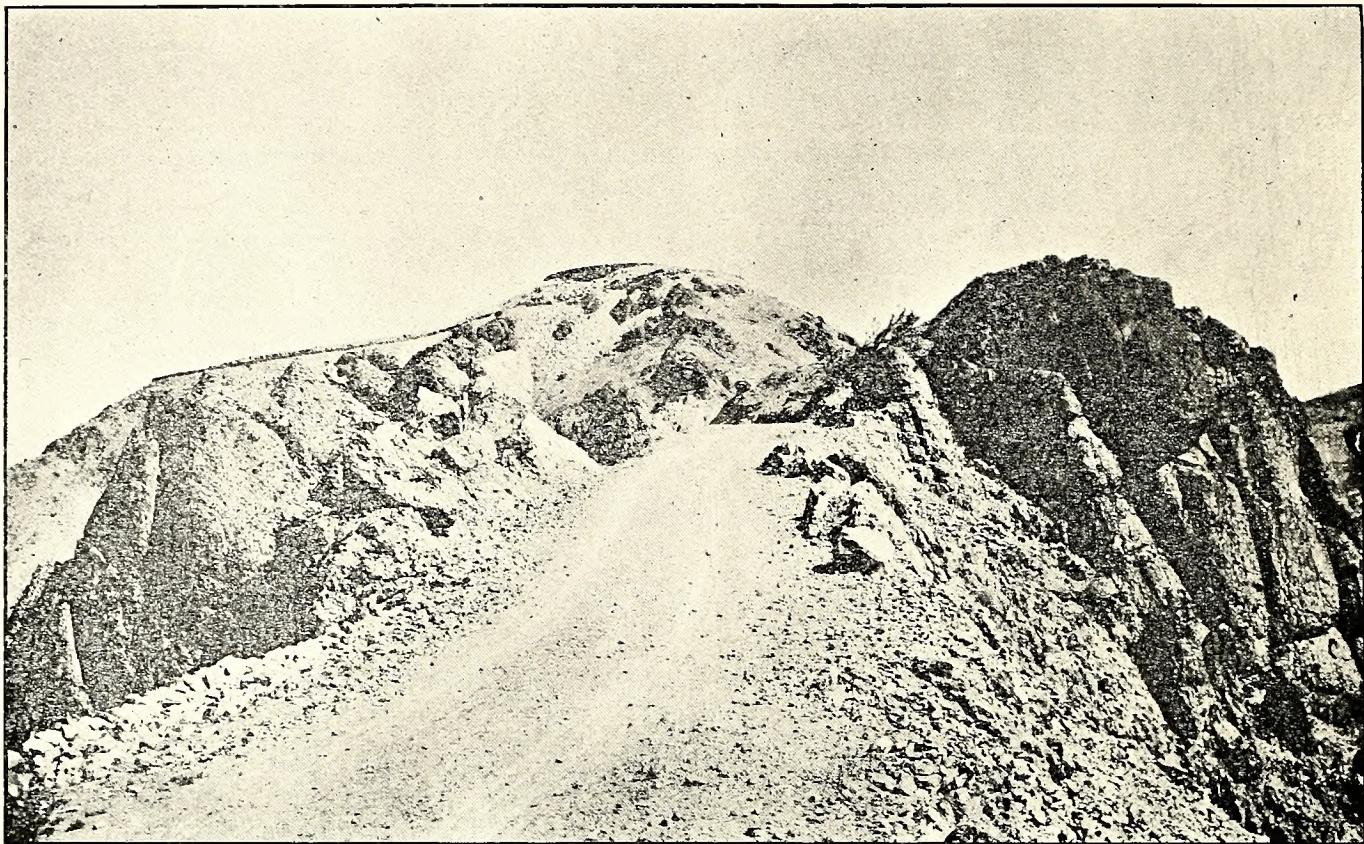
The numerous geysers and hot springs for which the Yellowstone Park is famous throughout the world have been portrayed so often that no attempt will be made to describe them here.

The views of Yellowstone Lake and the surrounding country, from the road which passes along its northern shore, are perhaps the most striking water landscapes



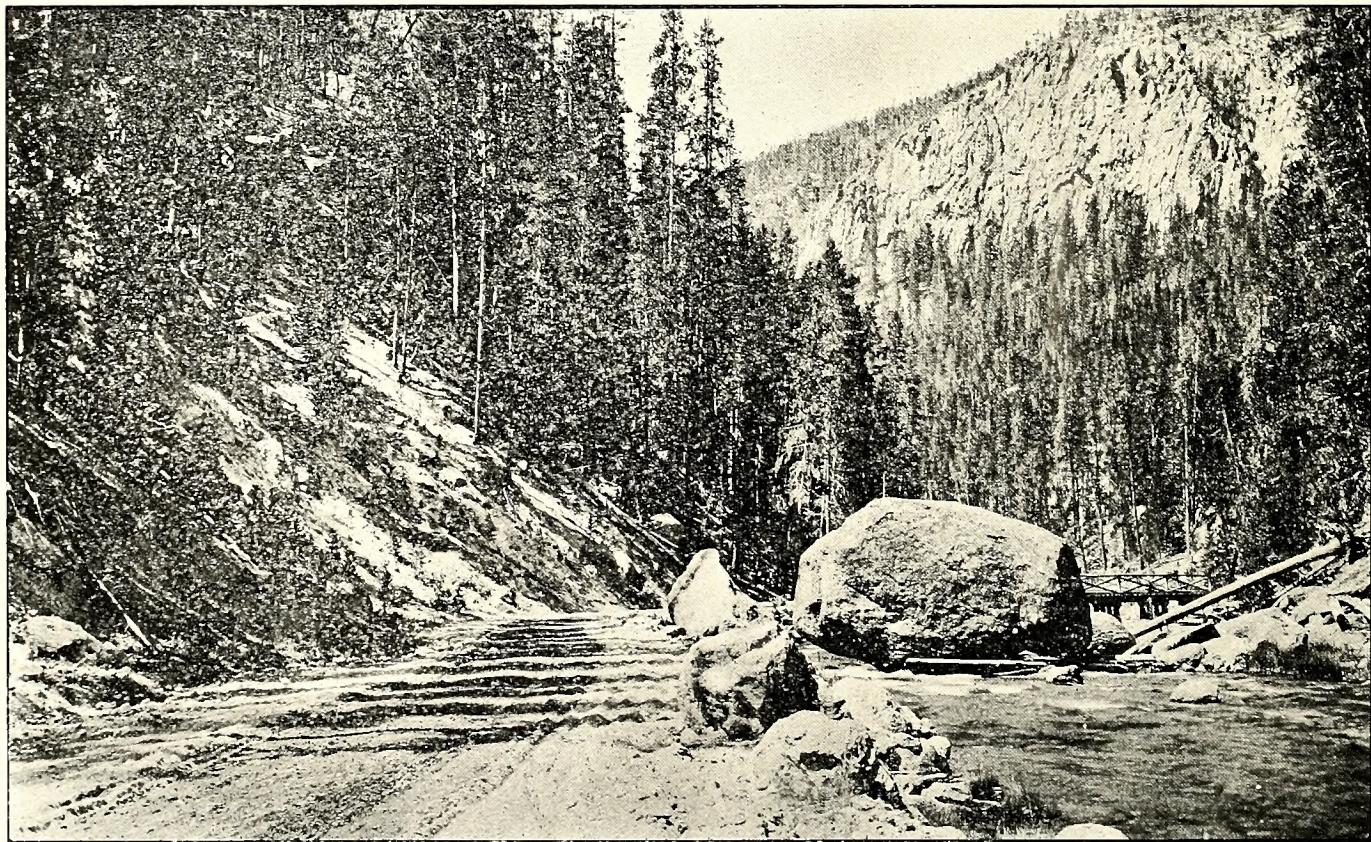
THE FINEST MOUNTAIN ROAD IN AMERICA

For scenic beauty the road to the top of Mount Washburn is without a peer in this country. Its construction cost \$5,230.89 per mile



NEAR THE TOP OF MOUNT WASHBURN

In the foreground is the big fill that carries the road to the base of the summit. Along the top, at the left, is seen the continuation of the road to the extreme summit, 9,800 feet above sea level



THE ROAD FROM OLD FAITHFUL TO THE LAKE

On the right is one of the huge boulders that here cover the mountainside. They vary in size from a box-car to an eight-room house

in the world. The Yellowstone Lake is about a mile and a half above the level of the sea, and is one of the highest lakes on the globe. It occupies an area of 139 square miles, has a shore line 100 miles long, and varies in depth from thirty to 300 feet. Its shores are lined with pine forests of dark-green color and its waters swarm with rainbow trout. The Absaroka Mountains, on its eastern shore, rise majestically from the water's edge, with domes covered with perpetual snow.

The scenery along the Yellowstone River and Canon is picturesque and grand. The road is so located that all of the most striking landscape features are brought prominently into view. At one place, the road winds gracefully around curves beside a placid stream, and at another it clings to the face of a vertical cliff far above a raging torrent.

About one-half mile above the point where the Yellowstone takes its first great plunge of 112 feet, the river is spanned by a handsome concrete-steel bridge. The arch has a span of 120 feet, one of the longest of its kind in the world. This bridge was built in order that tourists might examine the canon and falls from both banks. The road on the east bank leads to Artists' Point, where Thomas Moran painted his great masterpiece, which adorns the capitol at Washington. On the west bank, the road leads to Lookout Point and Inspiration Point.

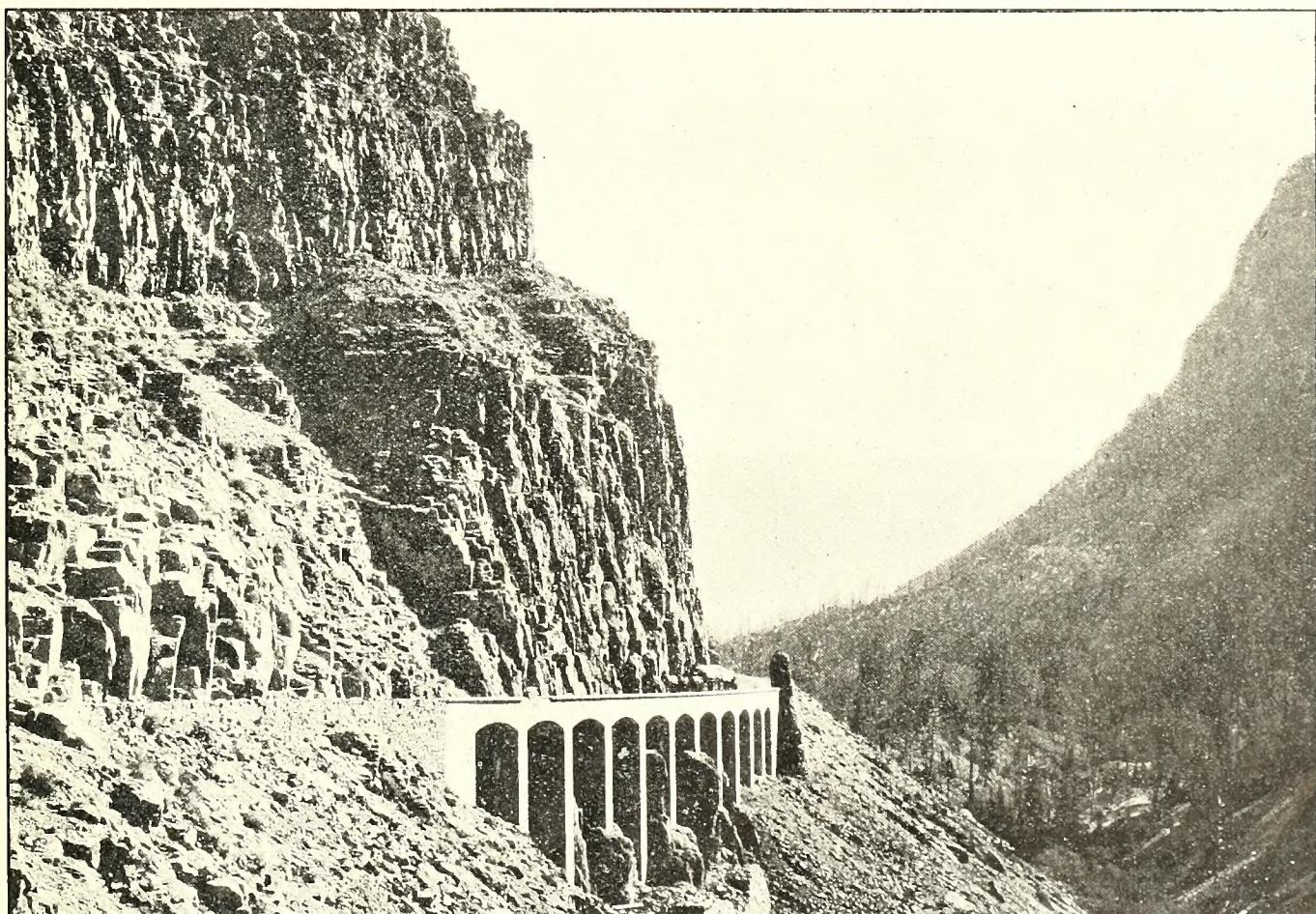
These roads wind along the very edge of the great precipice, affording magnificent views of the Lower Falls, which are 310 feet high, and of the canon itself.

The canon is about 1,200 feet deep and 2,000 feet wide. The rock, through which the river has cut its way, is so rich in color that no ray of the spectrum seems to have been left out. Yellow tints predominate and great ledges of gorgeous-colored stone hang suspended in the air; and, on isolated pinnacles, eagles build their nests and rear their young.

As a scenic highway, the road to the top of Mount Washburn has no peer, in this country at least. After leaving the canon, it extends for three or four miles to the base of the mountain through a beautiful rolling country, covered with dense forests. It then rises gently above the forests, and from it the peaks of Sheridan, the Tetons, and the Absarokas come into view. It winds around spurs, through deep ravines, and then crosses Dimraven Pass, where the real ascent begins. The mountainsides are carpeted with grassy plots, and the ground is literally covered with flowers so dense and rich in color as to resemble one vast flower garden. Dark green masses of fir and spruce stand in isolated clumps and groves, affording a pleasing contrast to the beds of crimson, purple and gold.

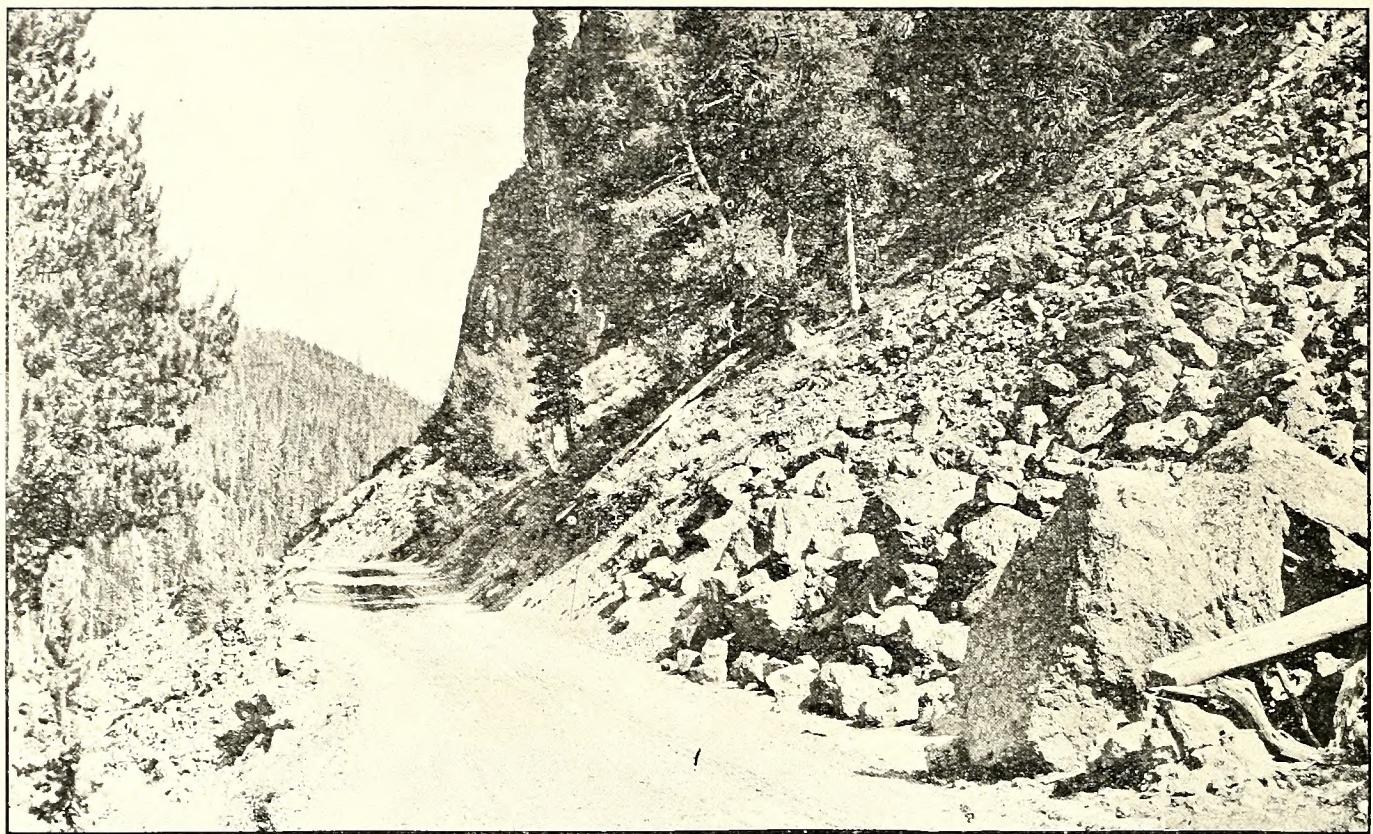
Wild animals in great herds are often seen browsing on the grassy slopes of Mount Washburn. These include deer, elk, moose, antelope, buffalo and mountain sheep. It is estimated that there are about forty thousand elk in the park. Mountain sheep are frequently observed perched on top of the highest crag in the neighborhood, gazing intently at the passers-by.

As the road climbs higher and higher, one loop above



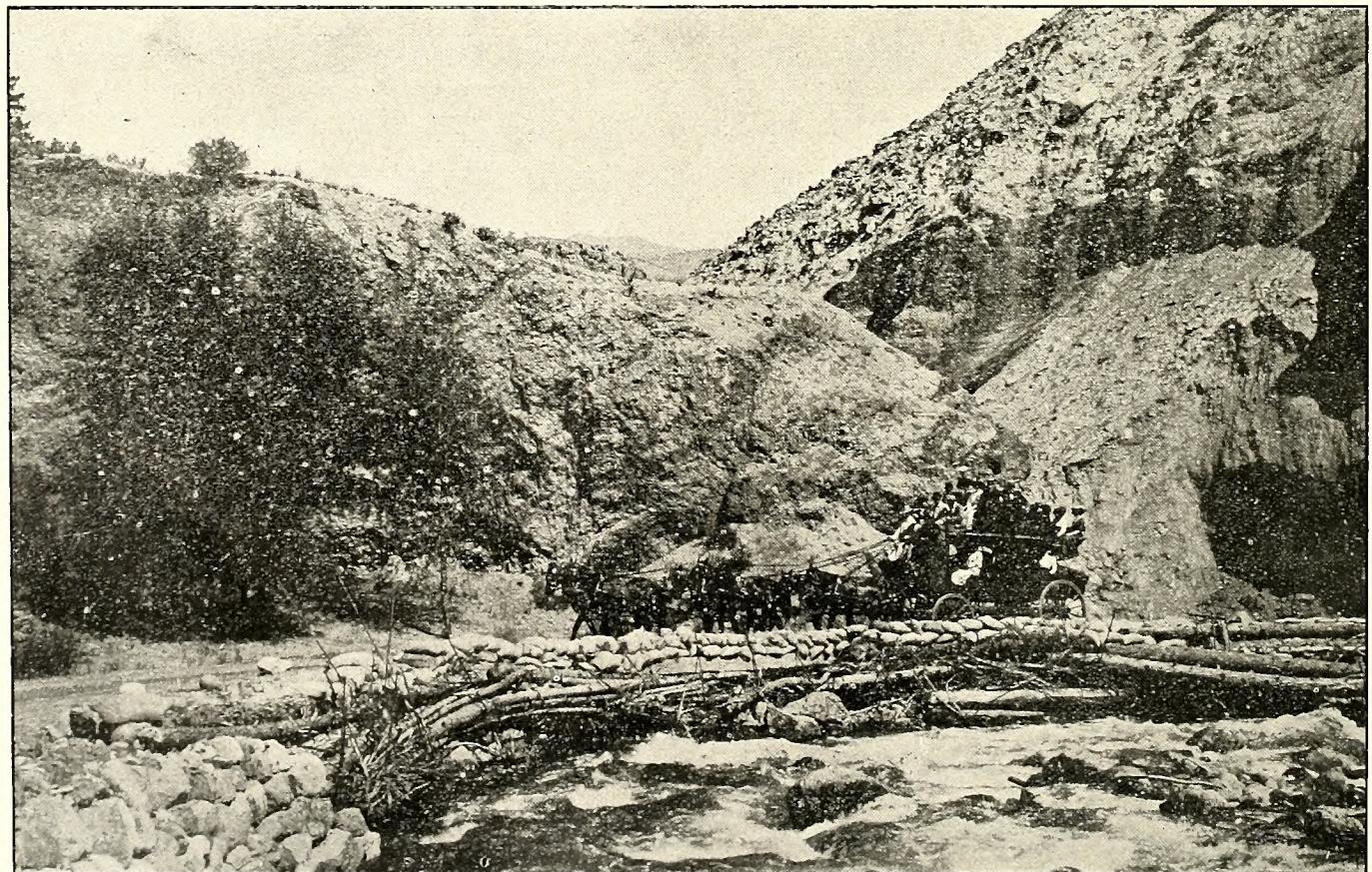
THE GOLDEN GATE VIADUCT

This is the most notable engineering feat of the whole system. It consists of eleven reinforced concrete arches of a total length of 220 feet. The road is on an eight-per-cent grade and a ten-degree curve



THE GLASS ROAD

Here the rocks are composed of black volcanic glass, a material so hard that, in constructing the road, it became necessary to heat the rocks with great bonfires and then pour cold water on them to break them into fragments



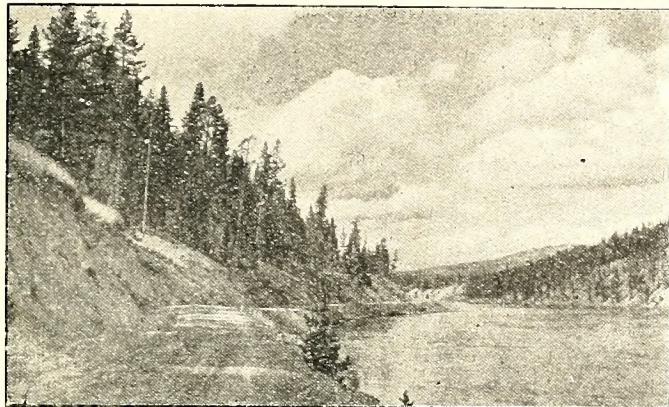
A STAGE COACH ON THE EDGE OF GARDINER RIVER

The coaches are usually drawn by from four to six horses. Many visitors make the trip in buggies, surreys or wagons, or on horseback. During the season of 1909, 3,545 persons made the trip through the park

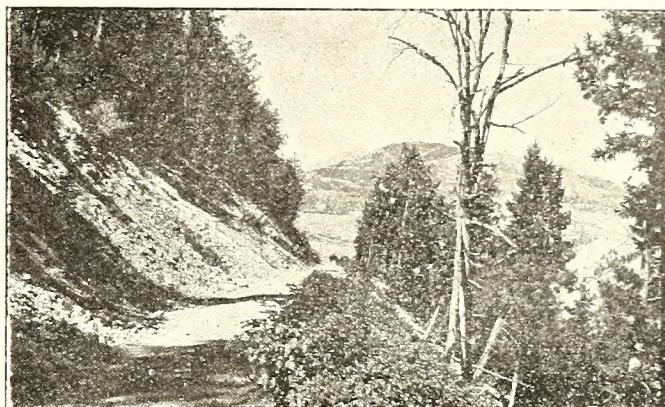
another, the view of the surrounding country expands. This portion of the road was exceeding difficult to build, and is dangerous to travel unless one is provided with trusty animals. Rocky cliffs tower far above on the one side and yawning chasms open upon the other. After numerous tortuous windings, back and forth on the side of the mountain, the crest of a rock ridge is reached. The road then leads along this ridge and crosses on a big fill to the base of the main summit. One loop around the main summit, passing through banks

and to the northeast a magnificent forested country, which forms the headwaters of Tower Creek. Indian and Pilot Knobs and numerous other peaks, inside and outside the park, some of them covered with perpetual snow, stand silhouetted against the sky. The mountains, the lakes, the streams, the sky, the forests, the rocks, the grass, the flowers and the roads, as seen from the top of Mount Washburn, form a panorama the like of which is seldom seen by mortal man.

To one who admires mountain scenery, the trip to



Yellowstone Park, Earth Road Along Yellowstone River,
Between Lake and Canyon



The Road at the Foot of Mammoth Hot Springs
Yellowstone Park

of melting snow, brings one to the top of the mountain 9,800 feet above the level of the sea.

The panorama from the top of the mountain can not be surpassed for loveliness and beauty. Far to the south, the surface of the Yellowstone Lake glimmers in the sun; the river winds like a ribbon of silver through the dark-green forests and then tumbles down into the Grand Canon, from which rise great clouds of spray. The huge crevice winding around the base of the mountain indicates the location of the canon.

To the north one sees the Gallatin Range, the Electric and Bunsen Peaks, and the Cinnabar Mountains,

the top of Mount Washburn is one of the most delightful which the park affords, but it is taken by only a small percentage of the tourists. The transportation companies do not encourage visitors to make the trip, because it is hard on the horses. It is not, therefore, included in the regular Belt Line excursion. Unless this is done, an automobile or trolley line should be established from the canon to Tower Falls, over the top of Mount Washburn, to return by the way of Dunraven Pass. Where there is one person who takes the trip now, there would be hundreds taking it if such a line were established.

Top-Soil Method of Road Construction Used in Clarke County Georgia

By C. M. STRAHAN, Professor of Civil Engineering, University of Georgia

Mr. President, and gentlemen of the convention: I realize that the hour is late, but I am going to ask your indulgence for a few minutes to present what I believe is an idea that might occur to a great many people, that has occurred to us in Clarke county, and which results in a very economic construction of very good roads.

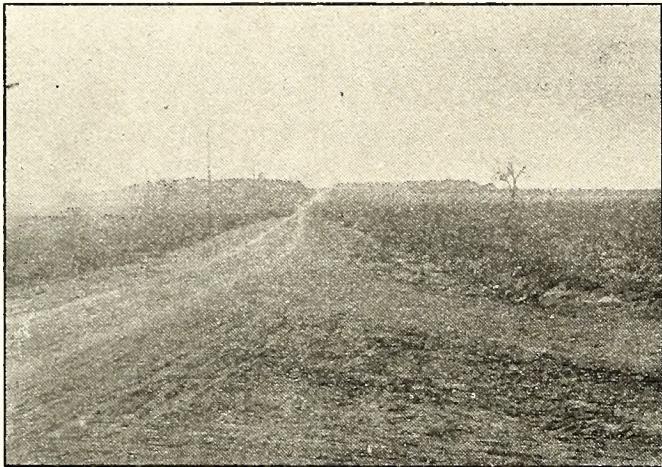
Let me preface my remarks first by giving you the greetings of the University of Georgia, and assuring you of its interest in the work of this association. The motto of a state university in this day and time which Georgia adopts for its own is "Service to the State," and on that basis, her interest in road building through her school of engineering is a very wide one, a very profound one. For many years past, the university

has turned out its quota of men who have powerfully aided and directed the road movement, and who are working along the lines in which all of us here are interested.

As county engineer, representing Clarke county here today, I feel that I am among my fellow soldiers and comrades, many of whom are on the firing line in this work, and I am assured in advance of a very sympathetic reception of the somewhat informal camp experiences which it is my purpose to portray.

I like to think of this road question as a warfare. It is a form of symbolism, but a very appropriate one. We may not go quite as far as Sherman's definition of what war is, but sometimes, when we strike the questions we do run up against, we feel it is almost hell, if not quite. Adopting the symbolism, we are conscious that we have a very real public enemy in

bad roads. To personify them, they are amongst the most serious criminals at large in the state today. Think what they do. They steal not only horseshoes and harness, and axle and tires. They go further and steal our time, our opportunities for education, for religious instruction, our contentment and happiness, and all those things with which we are so familiar in public addresses about roads. These are real and valuable things that are stolen from us, and worth large sums of money. They carry on a vast kidnap-



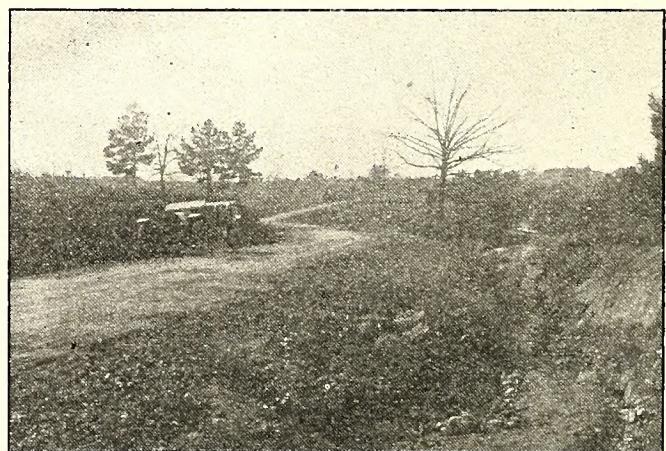
Clarke County, Georgia, Winterville Road, 30 Feet Wide, Top Soil Construction, Two Years Old. Shifted Roadbed in Background, Slightly Leaving Old Bed For Storm Ditch, Looking South-East

ping business. Did you ever think how many families and young men bad roads have kidnapped from the country, from the pure, free life of the rural districts of our states, only to throw them into the polluted and precarious maelstrom of city life?

So we have to fight this public enemy acting through its chief allies, water and grade, those ever-working forces of nature; and we need all the organization that an army in a serious campaign relies upon for efficiency. Wherever successful road work is going on, such organization exists under competent direction. Usually at its head stands the Council of War, to-wit: the Board of Commissioners which plans the general campaign, determines policies, and supplies and control the sinews of war. We have next the general-in-chief, the engineer, whose duty it is to study the battlefield, to direct all the field forces, to plan the attacks in just the right way and at just the right points. We have also the infantry, in the road working hands; cavalry, in the teams; artillery, in the big road machines and rock crushers. We have and must have ammunition, whether it be macadam, gravel, sand and clay, or, as in Clarke county, top-soil. And last but not least, we have the war correspondent, the press, standing by us in the field and sending in reports from the front telling of our victories, and winning new recruits to the cause and larger supplies and more ammunition with which to fight the enemy. It is a very gratifying fact to us all to see how much the efforts of the field forces are appreciated, all over the southland, and in this Appalachian Region. We are encouraged to see the camp fires of new field brigades flaring up in the hundreds of counties, and to know that the fight is going on vigorously all along the line, and that enough victories have already been won to bring prosperity to thousands of our friends, and to promise still more of the good things of life and of

happiness to our people in years to come. That is the situation in a nut shell.

We began the fight in Clarke county about twelve years ago, and our first gun was fired when the county put about three or four thousand dollars in my hands to organize a little company of twelve hired laborers, three teams, two or three scrapers and wagons. This little company marched out to battle. I pause to say just here to those who are trying to work up good roads' sentiment in their communities, that the support which equipped that company and started the fight was the town sentiment, and it is to the credit of the town population of the south that wherever successful road work has been done, the town vote, although paying the lion's share of road taxes, has almost invariably, (I speak accurately for Georgia,) forced this issue to the front and stayed behind it as a balance wheel to keep down petty bickerings. The town sentiment does not care whether the work is done on John Jones' road or John Smith's road; it says to the commissioners we want a certain number of well-built miles of road in return each year for the money expended. We leave to your judgment the method of handling the road forces and the roads upon which they shall be worked. That balance wheel is a most valuable factor, not that I am reflecting upon the rural sentiment. I can understand the farmer's point of view. The problem seems so immense and so hopeless that they do not vote for it because it just looks like they never can get good roads. The average man in Georgia used to think that even if you amended the constitutional limit of taxation, you could not raise enough money to make all the roads good. They did not realize how the gradual accretion of yearly work will make possible a thing which at the outset seemed well nigh impossible. These are points of view that have come to us in our experience.



Clarke County, Georgia, Danielsville Road, 30 Feet Wide, Looking South. Top Soil Construction, 2 1/2 Years Old. Shows Re-Location and Old Bed on Right

Where did we fire the first gun? If you will pardon me, I am going to assume a somewhat tragic air, and I will exclaim "Mitchell's Bridge Hill!" Perhaps that is not as familiar to those who hear me as the name San Juan Hill, whose hero will be with Knoxville tomorrow; but in the road annals of Clarke county, Mitchell's Bridge Hill is as important an event as San Juan Hill was in the Spanish war.

What did we do? We took this little brigade, a company of twelve laborers, and by a flank attack

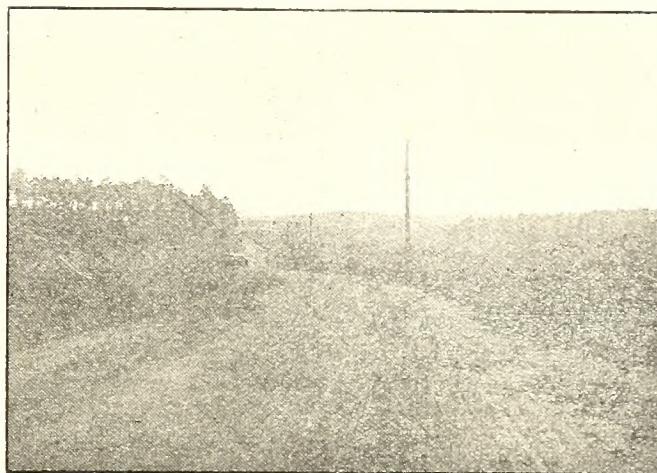
against a road with a twenty per cent grade for five hundred more, and we replaced it in a few months by a side hill road with a six per cent grade. That won us friends. The people called that a road victory, and from that time on we had no difficulty in securing the means for enlarging our active field force. At first our policy was stated thus: "Let us get our roads located right; let us put them in the right places; let us get them graded; let us put in permanent culverts and drain them and wait for a while longer for the surface." It did not take more than five or six years for this policy to be completed, and then came the idea of the bond issue, and we voted a hundred thousand dollars worth of bonds with which to put surfacing on the roads. Thinking at that time that the best thing to be used for surfacing was macadam—of course we were going to use our local rocks—we wasted \$50,000 of that \$100,000 in making macadam roads. You understand me, I am not attacking the macadam road in itself, but the natural rock in Clarke county is a highly micaceous rock and does not make good macadam, and, more than that, it did not answer the demand of our people in that you could not build it fast enough. The people became impatient and said, "You may be fighting, but you seem to be standing still. Why are you not whipping this enemy? Why do you not cover more ground? You only get in a mile or so each year. You are wasting money." A blind quarry was opened and had to be abandoned, thus losing much time and several thousand dollars. Discontent with the rate of progress resulted in the reorganization of the management. After the new management had struggled a while with macadam, they began to stop and think about this macadam proposition, and about what the county wanted in carrying on this fight. They took a new view of what that warfare was. They said, "Maybe we have been using solid shot when we should have used canister. We will have to try some different sort of ammunition. We will have to get an ammunition that is found ready made, where the arsenals are at hand close by, and where we can get it and fire it at the enemy right away, quickly."

Mr. W. S. Holman, who is the superintendent of roads and a member of the Board of Road Commissioners had heard about the sand clay road, and he tried about a mile of it, using layers of clay and layers of sand. This took too long to consolidate. Clarke county is in the foot hills of the Blue Ridge, on the eastern side, and her soils are mainly of clay; but many of them have this clay charged with gravel and sand. Such soils were found along our existing roads in great abundance, and the surface of those roads in places were good at all times of the year, and showed little wear, not more than two or three inches below the adjacent surface after fifty years' service. This, Mr. Holman noticed; and reflected that such soil looked like pretty fair road material, coming with such a history behind it, and the question was immediately put, "Why not go out into the farmers' fields adjacent to these good stretches and get some of that material and spread it along the road, and then harden it down?" Why would not that make good ammunition, better than macadam because already prepared and so close by. That is a simple idea. You will notice the samples in these bottles. It is similar to artificial sand clay mixtures but you secure them already intimately mixed by the farmer during cultivation. We get this soil from the cultivated field where it has been pulverized and acted upon by the weather. It will consoli-

date at once when placed on the road under the action of the traffic. The first samples show the way the soil in the field looks. If you wash out all the softer part you have left the sand and gravel as seen in the second bottle, representing about sixty per cent dry weight of the original soil sample.

This kind of ammunition is to be found in our county not just in one arsenal; but every mile along the road, in every part of our county we have been fortunate enough to find similar ammunition ready to shoot, and we have not had to carry our ammunition for this top-soil construction more than a maximum distance of half a mile, the average haul being in the neighborhood of five hundred yards. That is why the top-soil road surfacing costs about \$500. We get the sand and clay already mixed. They are already prepared on the farmer's field, and we buy it from him at a fair price, using the top eight inches of soil.

There are different grades of this ammunition. All of them are not equally good. But here is the point about it: They do make a good road that does not soften in wet weather. We have to put it on right, we



Clarke County, Georgia, Barnett Shoals Road, Looking South. Top Soil Construction, 30 Feet Wide, One Year Old

have to fire it right. The first thing we do, of course, is to aim. By aiming, I mean you get the road in the right place, get it smoothed out, get it straight and flat. Maybe this drawing here will save me words. This big map of Clarke county shows how in many places we have relocated our roads, but I won't go into that, it is so near dinner time. I just simply want to give you some idea, if some gentleman will help me with this cross-section map, of how we actually fired this ammunition. We bring the road to a level grade, making it thirty feet wide. We then put a bed of this top soil sixteen feet wide and ten inches deep in the center of the thirty-foot roadway. Our recent practice makes the top-soil twenty feet wide. The road machine then excavates the shallow side ditches and throws that dirt up as a kind of shoulder against the top soil, the same way on both sides. Now the traffic and construction teams ride over this soft bed of material and begin to consolidate it. At first it is rough and irregular. We go back after a little and reshape it with the road machine. If we can get some rain, or bad weather, so much the better. The new surface will be temporarily muddy, but it will incorporate and puddle to good advantage, and then when it dries out we can shape it back with a better crown and it will hold its shape permanently. In the course of about

two months from the time you make it, that road will be hard, will be of the consistency of that consolidated sample I have here, and it will not soften down any more even under three or four weeks of rain. Last winter, when we had successive freezes and thaws for six weeks, you could not find an inch of mud on our top-soil roads anywhere.

Now, this material costs us only \$500 a mile, paying the farmer for it. We pay him sometimes as much as thirty dollars an acre, almost the value of his land, for the top eight inches which we use. It is well worth a good price for we have found that the annual maintenance of these roads is less than \$25 per mile.

Let me explain my theory of why the top-soil does not soften in wet weather. I am not sure my theory is right. It is purely tentative at present. The clay in the top-soil has, by cultivation, been brought to a very finely divided state. It has also been exposed to the weather, and to the action of vegetable acids from the crops that grow on it. Now, whether a chemical change has been wrought in the character of the clay which keeps it from absorbing water like freshly exposed clay will do, or whether the finely divided state to which it was reduced gives it cementing properties

in the county of Clarke, and I believe I can get Mr. Eldridge over there to support my testimony. He was good enough to come to Athens some two years ago, and the roads which he then saw are every whit as good today as they were then. They do not get muddy and they do stand the wear of a heavy country traffic.

We put the top-soil on ten inches thick, so by having a thick bed the water that does soak into the surface will probably go down to the bottom and drain. It is thick enough and strong enough so that the weight of the traffic will not cut through it into the clay sub-soil. If we used it only four inches thick, results would be poor. If we put it on ten inches thick it will pack down to about eight, which is ample to hold the loads. Of course you notice we put it on the top of the flat roadway that we have prepared. We do not dig a trench and fill the sub-soil down in the trench, because if we did so the water would go down into that and be held by our clay sub-soil and certainly tend to soften it.

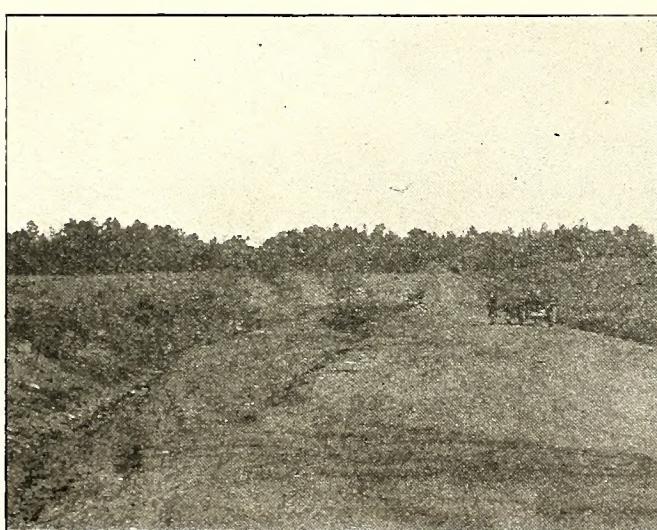
We believe that top-soil construction is a good thing. We believe it is a good thing not only for Clarke county, but for other sections. I saw, in Orange county, Virginia, this summer—the people there are stirred up on this good roads question, macadamizing and what not—and I took occasion in their behalf to investigate the condition of their public roads, and I looked into the question of their top-soils. I found samples that were every bit as good in character as what we have in Clarke county.

Mr. Wilson (of Virginia): Did you find any in the neighborhood of the macadam roads they are now building, or was it in the lower end of the county?

Prof. Strahan: That was on the other side of the county where the people were interested and where I examined the soils. There were good soils near Orange courthouse. Are you from Virginia?

Mr. Wilson: Yes sir.

Prof. Strahan: Some of the top-soils near the courthouse I thought were good, but I investigated more particularly down in the Pamunkey neighborhood. Not long ago, I went down in south Georgia, in what geologists call the Altamaha Grit section, in Grady county, and I had occasion to drive across about twenty miles from Cairo over to the other railroad. In that trip I saw an abundance of top-soil which would make a most valuable road. We all know in Georgia about the gravels, the Augusta gravel, and the gravels that lie down toward Columbia county and Lincoln county, and in part of Wilkes county, that have clay binders, and it seems to me that here is a broad proposition that is absolutely fundamental in securing a general net work of good roads. I don't mean those special highways upon which special sums can be spent and which should be built substantially and thoroughly for extra-heavy traffic. But to extend good roads into the outlying regions of the county, we must have a cheap local material to surface the road with. Let me suggest this to you. I do not want to detain you too long. But what kind of a road do you want? We call our movement the good roads movement. Don't you think what you really want is an efficient road? And what is an efficient road? The efficiency of a road, whether for freight or passenger traffic, is measured by the time it takes to make a trip. I won't go into that. You are familiar enough with this road problem to see that it is true. What are the elements that affect the time of this trip? They are, the absolute distance or mileage, the grade you use and the surface you use. As



Clarke County, Georgia, Danielsville Road, 30 Feet Wide. Six Months Old.
Top Soil Construction. Re-Location and Grading. Old
Road Appears on Left

it would not have otherwise, both of these two things are at work. Whatever the cause, the selected top-soil of clay and hard aggregate does give a hard, firm, and durable surface. You may take a clay road, and in dry weather it has one of the finest, hardest surfaces imaginable, but that same road, as soon as a good rain comes, will cut to pieces in mud in a few hours. The top-soil road does not, and we have frequently had occasion to observe them, one where the clay has been graded and finished, and the other where the top-soil is, just following right behind it, and the clay part cuts into holes while the top-soil part preserves its surface unimpaired.

Perhaps what I am saying may seem impossible to you. Four years ago I would have very much discounted any speaker who made the statement to me that I am making to you. As an engineer, I would have said you were just simply trying to build a dirt road of a special kind, and it would not stand traffic; you will have mud on it, and all like that; but I can testify from the experience of three years and of sixty miles

soon as you get to thinking about it, the surface is the most important one of those three elements. Suppose you have a perfectly level road, and yet it is full of mud holes. What do you think about the time it takes you to go over such a road as that? Suppose you have a very short road whose surface is all broken up? Suppose you have, on the other hand, a fairly steep road where the surface is perfectly smooth. You can get over it in comparatively short time; so the surface after all is the chief measure of efficiency; and with us, this top-soil material gives a surface that was more pleasant and smoother than a macadam surface. The automobilists in Georgia speak of the Clarke county roads as the best and most pleasant to drive over of any they meet. It is the surface. It stands automobile wear better than macadam.

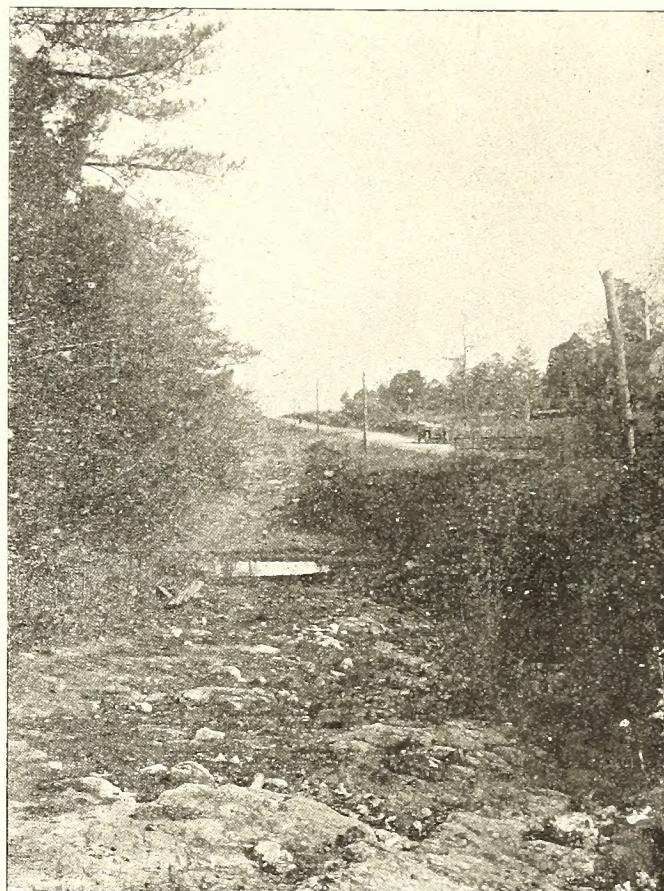
In Clarke county we are going to continue to use this top-soil ammunition on all of our roads. We want to have the low grades, so that the top-soil surface will not be destroyed by washing. We limit the maximum of grade on our roads by the grade on which this ammunition will hold. We have tried it up to six per cent. We prefer four per cent as the maximum. All our main roads are being brought to a four per cent maximum. On that Mitchell Bridge Hill, it is standing very well on a six per cent grade. From the way the top-soil surface wears on the roads we have built, I believe it has a life of fifteen or even twenty years. You notice we put in a thick bed to top-soil. We put in this thick bed of material for the reason that we do not want, when the question of partial wear of the crown takes place, to send teams off to haul in new material. We can dress the surface to shape after long spells of wet weather. It gets so hard you cannot cut it off with the road machine in anything like dry weather, so we wait for wet weather and then shape it off. We start with a high crown and reduce it gradually to a low crown, and do not use over again the scrapings from the side ditches.

You see why I take the liberty of presenting this subject. Top-soil is not an absolutely perfect ammunition, but it is the best ammunition at \$500 a mile that has been offered, so far as I can see, anywhere in this country. Now, the real thing I want to impress on you is this: Any man who is working for good roads in his county owes this much to his county—search in that county for local material, widely distributed and close by the public roads. If you can find those local materials, use them. Use them at first because they are cheap and you can make quick progress. You have not lost anything. Suppose your top-soil roads prove weak. They are at least better than the old earth roads, and if you want macadam ultimately, you have a better foundation for macadam at low cost. Not only that, but we find by experience which are the best deposits of soil. After we get a road prepared with any grade of top-soil, we can then use large traction engines and go back to these good and proven deposits and spread it over longer distances, at low cost, to perfect the partial improvement which the less desirable top-soil had effected.

That is the theory we have in our county. We are improving all our roads with the top-soil nearest at hand. If any place becomes bad and shows it is inferior, we will go back then with a good road to travel over and haul a better class of top-soil and put on top of it. The matter has progressed so far towards a fixed sentiment in our county that we have sold our rock crusher, and the chances are, within the next three years, that the macadam roads we built will be con-

verted back into top-soil roads, by covering the present macadam surface with top-soil.

You may say we are especially well situated, and I am prepared to grant that we have been very fortunate in finding good quality soils. But we are not alone. The idea is valuable over wide areas of our Appalachian country. In our county we have progressed to a stage that seems to be satisfactory to our people. Even though we wasted \$50,000 of our bond issue on poor macadam, with the other \$50,000 we have reached a



Clarke County, Georgia, Winterville Road. Top Soil Construction, 30 Feet Wide, Two Years Old. Showing Bridge Concrete Abutments 3 8-10 Per Cent Maximum Grade. Old Road Bed Leading Across Ford On Left of Picture

point where our people were willing to raise their tax rate, not a large amount, but to raise their tax rate, and we are working a force of eighty convicts in our county now at a cost of \$23,000 a year, and the whole sum being raised by about a three mills road tax. The state taxes were five mills and the county taxes five mills, making in all one cent on the hundred, or one dollar per hundred for state and county purposes. Out of that five mills, of course, not only does the road work come, but all the other county expenses. It is clear to me that where you satisfy people the way we have done, giving them valuable roads at a reasonable cost, you will find, certainly, if you have the town back of you, that you can keep up a winning fight and never lack for support. We cannot conquer bad ones and then go away and leave them. We have the maintenance question with us always, as a constant expenditure, but in the course of four years we hope, in Clarke county, to have all the main highways covered with top-soil. Thereafter about one-half as many convicts as we now use will be sufficient to make repairs

and build those extensions on the secondary roads that are needed.

Now, just one thing. All of us were struck by Mr. Finley's address this morning. I was struck by this statement, but he did not elaborate it with the fullness I think it deserves. It is the idea that before going into road improvement a comprehensive plan of what is to be done in the county should be mapped out first. You take Clarke county. The first thing our commissioners did, almost, was to have a road map made. You notice we have several rivers in this county, and a good many creeks leading down into the rivers. The commissioners asked me for advice on "How shall we develop our road system?" After studying this all over and making this map, I said, "Gentlemen, certain of these roads are today first-class roads. They carry the big county local traffic. The configuration of the ground is such that down this way is a ridge that di-

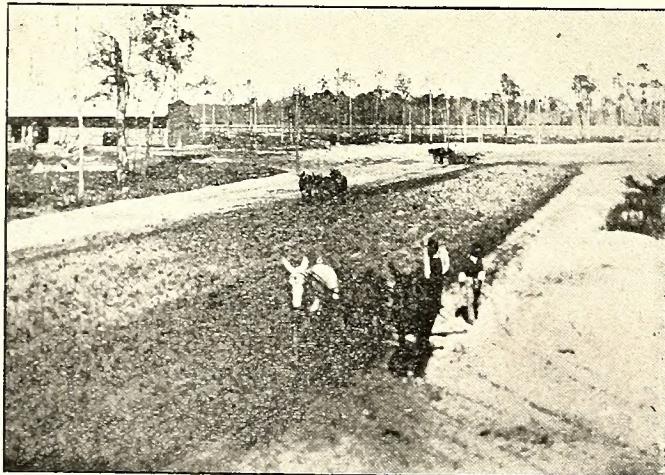
vides the water shed. If the population increases in this county they will have to settle on either side of this ridge, and that is going to be a first-class road." So we have classified the roads not as to the way they exist now—some of them are mere paths—but as to what they will be when the county is fully developed. We will wait for the development of certain areas, but we have a comprehensive plan, and all work done can be wisely related to future needs. It is in things like this that the engineers can help the county. Formulate your program and then, when the work begins, let every link be in accordance with that program.

As you see, I am enthusiastic on this question. All of us are, as a matter of fact. I do not want to talk you to death. I know it is dinner time and I thank you very much for your very kind attention, and I wish to say that I value the privilege of being able to be with you.

A Sand-Clay Race Track

By MR. E. W. JAMES, United States Road Engineer

Professional horse-racing, which had degenerated into little more than professional gambling, has been much restricted by legislation in those states where it was most popular. But horse-racing is a proper and legitimate sport, and the breeding of good horses and their display are as popular as ever. No greater evidence of this local interest in horses and horsemanship is to be found, in the season about to close at least, than that displayed in coastal Mississippi by the Harrison



Harrison County, Mississippi: Fair Grounds Race Track
Plowing and Harrowing Sand Clay

County Fair Association. At Gulfport there has been constructed the finest half-mile track in southern Mississippi, and as the details of its construction include some interesting features, a brief description of the work may be worth while.

The Harrison County Fair Association purchased a forty acre tract just west of Gulfport, on the Louisville and Nashville railroad, and developed it into permanent fair grounds. The location of the grounds is good, handy to the town, to the railroad, and to the trolley line between Gulfport, Pass Christian and Long Beach; but to secure the advantages of good location almost every other consideration was rejected. On the property there was one sandy hummock and three

bottoms, filled with gums and palmettos, mud and water. On this land a half-mile race track, fifty feet wide, surfaced with a sand-clay mixture has been built, and the success of the construction may be judged when it is stated that the track gave satisfactory service during a series of races lasting six days, the first of which was called on Nov. 9, 1910 when the track was less than six days old.

There are certain features essential in race track construction that cannot be at once attained, no matter how skillful the builder. An English gardener who was at work on a particularly fine lawn was asked how he managed to cultivate so fine a sward. He replied that the first thing to do was to have your grandfather plant it when he was a young man, cut it and roll it once a week for thirty years or so, and turn the sheep on it one season in three. It might similarly be said of good race track building that one of the first things to do is to have it begun a year or so ago. For the track must be well settled and compacted underneath and cushioned on top. It cannot be built of materials that will in any way bridge a soft subgrade; loam or clay are the most satisfactory surfacing materials. If a heavy crust is rolled in an attempt to put a track quickly into condition while yet the subgrade is unsettled, the result will be a rubber-like surface and a "dead" track. The ground will yield to the hammer beats of the hoofs and a certain part of the propelling force will be lost. The rider will feel his horse give under him. The work at the fair grounds of grading for buildings, track, and foot-ball field, construction of all buildings, draining, fencing, and building approaches, was begun almost exactly two months before the first races, and in that time the track was graded across the gum bottoms and surfaced. It was out of the question to prepare the usual elaborate foundation courses, which on some professional tracks have been made several feet thick, with their deep laid, heavily crowned drainage course of large gravel, covering course of sand, upper drainage course of cinders, second covering course of sand, and final wearing course of carefully screened loam or clay. The only feature of the natural conditions favorable to the work at Gulfport was the sand embankment. This naturally provided a fair sub-drainage.

The track was laid out by Mr. H. D. Shaw, City Engineer of Gulfport; Mr. W. A. Hughston was the contractor for all earth work. The cross section was made level for the fill and through some misunderstanding this cross section was continued at the curves, resulting in a dead level sub-grade without banking. Consequently, owing to the lack of time to do additional work, the track was banked only as much as could be done in the surfacing. The stretches were 530 feet long, the curves 790 feet long.

The entire southern end of Harrison County, Miss., is underlaid with the Norfolk series of sandy soils, the Norfolk fine sand predominating in the region round Gulfport. No clay was available at any point nearer than Saucier, in sufficient quantity and satisfactory quality for the work, and it was arranged to bring the clay by rail from that point. Saucier is nineteen miles north of Gulfport on the Gulf and Ship Island railroad. One hundred cars of clay were used, amounting to about 2400 cubic yards. A steam shovel was used to load, and the cars were provided with side boards to increase their capacity. The loading and delivery to the siding at Gulfport cost nine dollars a car. This included the cost of the clay which the railroad dug from a cut at the eighteen mile post on its own right of way. From the siding the haul was 3300 feet to the fair grounds gate. Some cars were later delivered to a private siding slightly nearer. The contract price for loading, hauling and spreading was sixty-five cents a loose cubic yard, wagon measurement being accepted, checked by car measurement and ribbon measurement on the track.

It was originally planned to put down six inches of clay over the entire track, but after the spreading had been begun at this rate, the ribbon was first reduced to five inches and later to four inches to decrease the cost. In completing the sand-clay mixture the usual methods were used, mechanical mixing being had by a No. 3 railroad plow and a pair of heavy disc harrows.

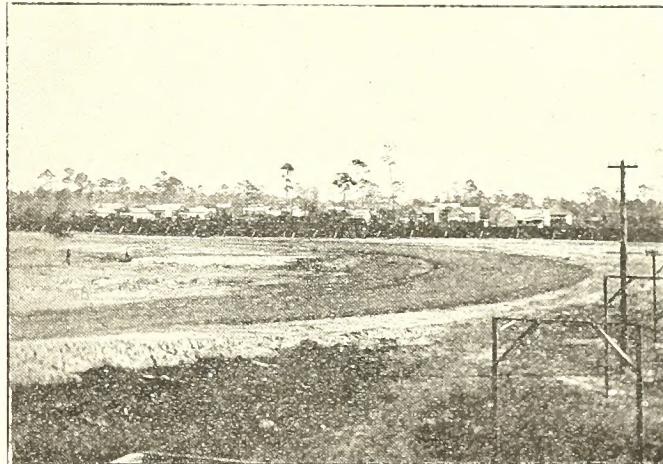
The clay used was the subsoil of the Norfolk fine sand, running into the stiff mottled variety, and heavy in sand. Careful tests were made on clay balls of varying mixtures to determine the best proportions and it was found that with the clay as it ran, slightly less than half as much sand could be added. On two or three occasions the shovel brought down a good deal of surface sand and, as no inspector could be kept at the pit, it was loaded, and care had to be taken at the points where this clay was spread to plow a lighter furrow. The clay was laid down to the entire width of fifty feet. Three grade stakes were set in cross sections taken at fifty foot intervals on the stretches and every twenty-five feet on the curves. The ends were banked eight inches only, as this was considered the maximum that could be secured in dressing the sand-clay. Adopting the customary practice for elevation on race-track curves, and assuming a speed of a mile in two minutes, the banking should have been at least four feet. It is planned to regrade the curves and bank them to this figure before another year.

After plowing, the sand and clay were thoroughly harrowed with discs. Owing to the lay of the land the track itself was the only line over which the clay could be hauled, and the clay in some places became in consequence very hard, and large clods formed which the harrows rode over. Sand bags were used to weight the harrows and after considerable discing the clods were pulverized sufficiently to permit shaping. This was done with a sixteen foot split-log drag. The first drag made was from a 5 inch gum log, and was too light for

the work. It was loaded with sand bags but failed to give satisfaction and was at last pulled to pieces. Then a drag was made of 4in.x6in. pine, 16 feet long, thoroughly braced with 4in.x4in. thwarts and 1in.x6in. diagonals. This did its work rapidly and efficiently with four mules.

Ordinarily it is considered a waste of time to roll a sand-clay road. For strictly highway purposes this is true, but for the special use to which the track was to be put rolling was essential. A seven ton horse roller was used and this finished pounding down the clods. Further to pulverize the clay and to keep the surface cushion required, an iron-peg harrow was used. This was four feet square, built on 4x4's and heavily braced with diagonals and cross pieces of the same. Iron pegs of $\frac{5}{8}$ inch bar iron were used outstanding $2\frac{1}{2}$ inches and so placed as to be well staggered. The driver sat or stood on this harrow and it served to cut the rolled surface well. Later it became necessary to load the harrow with a sand bag as the track became harder.

The peg harrow was dragged by the corner and a



Fair Grounds, Harrison County, Miss. Race Track, After First Dragging With Split Log Drag

slight wobbling motion caused by its being in this position increased its effectiveness. After peg harrowing the surface was well sprinkled with a street sprinkler borrowed from the city of Gulfport, and as soon as the surface had dried enough to prevent its sticking to the roller, the surface was again rolled. During these first two rollings the stretches were rolled from outside end inside toward the center, to prevent spreading of the embankment and to preserve the slight crown of 0.25 feet provided. The curves were rolled from the inside toward the outside, except that the extreme outer edge was rolled at once after the extreme inner edge.

The track was then gone over with a grading machine to scrape down any slight inequalities in the surface. The entire track was then again well sprinkled and allowed to stand.

The next day the rolling was completed twice, the peg harrowing being omitted after the first rolling. The idea of the peg harrowing was to permit the accumulated rolling to compact the soil beneath the surface, and at the same time prevent the surface from hardening. The track was again dressed with the grader to catch some remaining high spots and left.

The treatment of the track consisted of harrowing, sprinkling, dragging, rolling, using grader where necessary. After two treatments it was found that the dews were so heavy that the track could not be rolled to advantage early in the morning, and the work was planned so that sprinkling came first in the morning.

The "deadness" left the track after its third rolling and the surface continually improved afterward. By harrowing the last thing at night very little sprinkling was necessary in the morning as the loose soil was already thoroughly dampened. Later in the morning the hot sun soon dried out the immediate surface and thus a minimum of time was lost waiting for the track.

On Saturday, five days before the races, it rained hard all the afternoon and most of the night. Sunday the track was soft in some places and here and there somewhat sticky. But by Sunday afternoon it would not stick to a tire or shoe and on Monday morning when final dressing began it was harder than before the rain, indicating that the very fine pulverizing the surface had received had in a measure replaced the puddling usually necessary.

On Monday and Tuesday the drag was discarded and the grader used to cut down all irregularities. Otherwise the treatment continued the same.

For use between morning and afternoon races a brush harrow was made of four young pines about 6 feet high, with close even growth, and a 2x6 piece of pine. The butts of the pines were nailed to the under side of the plank so that the harrow would run free with nothing but the branches dragging. This served well to fill hoof marks and sulky tracks in the loose cushion and dress the track.



Harrison County, Mississippi Fair Grounds Race Track Completed. Second Days Racing, Which Shows Value of Split Log Drag

The location of the track and its size made it an easy matter to get data on a horse roller speed. The seven ton Austin roller that was used was hauled by seven mules. The speed was almost exactly two miles per hour. On every timing the half mile varied less than a minute. The dragging, with four mules, was slightly slower, the speed being one and three quarter miles per hour. This varied with the moisture in the track. When the soil was heavy it stuck to the drag and time lost as well as the extra loading decreased the speed substantially. With six mules on the 16 foot drag the speed was generally like the roller and varied much less with damper soil. The peg harrow with two mules, driver riding, traveled two and three quarter miles per hour, and the brush harrow as fast as the mules could walk, the load being nominal.

The sand-clay mixture developed a high abrasive power, and under the repeated pulverization and sprinkling set very hard. On the third day of the races the peg harrow teeth were worn flat and refused longer to cut unless the drag were weighed with about 500 lbs. The teeth had to be resharpened and the rolling was discontinued thereafter, as the track was thoroughly

hard below the surface. Treatment after this consisted in harrowing and dragging, with light sprinkling, to lay the dust about two hours before racing.

In spite of the deficient banking the track developed good speed. On the first day the best trotting heat was 2:28, pacing 2:19. On the third day the best trotting heat was 2:18. During the following week the track developed excellent qualities as an athletic track, the stretch being specially dressed for the purpose.

The J. I. Case Co. Enlarging.

The addition to the boiler shops of the J. I. Case Threshing Machine Co., Incorporated, Racine, Wisconsin, is just being completed. This is a building 60 ft. by 215 ft., which will be used exclusively for a stock room for the Case boiler shops. A boiler storage has been completed 230 ft. by 60 ft. This is equipped with a traveling train for movement of boilers from one part of the building to another. Under the supervision of the Case architect the above work has been undertaken and completed, also the remodeling of the Garfield warehouse, which is 100 ft. by 250 ft. and two stories high. This building, when the remodeling is completed, will be used as a machine shop. Machine shop facilities have not been adequate. As soon as the weather will permit, other buildings will be put under construction by the Case architect and completed. The heavy business for the past year has necessitated all these changes.

Indian Liquid Asphalt Pleases.

Mr. Sam E. Finley, manager of the Indian Refining Company, Atlanta, Ga., informs Southern Good Roads that arrangements have just been made by the commissioners of Mecklenburg county, N. C., to treat six miles of their fine macadam roads with Indian Liquid Asphalt. The city of Fayetteville has also arranged to treat five and a half miles of macadam streets with it and in both places samples of the material were put down last summer for a test. The company now has down in the state of North Carolina forty miles of liquid asphalt.

The blue ribbon goes to Minnesota for the latest in the way of raising money for the building of good roads, says the Texas Commercial Secretaries' Association. At Mankato, Minnesota, during November, a dance was given following an all day good roads convention and the community sending the largest delegation to the dance received a prize of fifty dollars to be expended on the improvement of the public highway leading out of Mankato to their community.

"Road building is a science," said G. L. Cooley, representing the Good Roads Department of the Federal Government at the Good Roads Convention at the Dallas, Texas, Fair. "There is no more reason why a man should work out his road tax than that he should teach out his school tax. We lose millions of dollars annually by lack of intelligent application of road funds."

The improvement of public highways adds three times their cost to adjoining property and every argument that applies to the improvement of private property will apply with multiplied force to the improvement of public property and especially to public highways as everyone must use the roads. Build roads and increase the value of your property.

SOUTHERN GOOD ROADS

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DR. JOSEPH HYDE PRATT, Secretary and Treasurer, Chapel Hill, N. C.

Official Organ Southern Appalachian Good Roads Association

DR. JOSEPH HYDE PRATT, President, Chapel Hill, N. C.

W. L. SPOON, Secretary, Burlington, N. C.

VOL. III.

JAFUARY, 1910.

No. 1.

With this number Southern Good Roads enters its third volume. Its past has been a series of triumphs and it looks forward to the future with confidence and hopefulness. The magazine has made a place for itself in the world. It has won the confidence of the road-builders of the country, especially of the south, and we are glad. It has been our purpose to make the magazine helpful to the great army of road builders and road advocates in the south and to this end we enlisted the leading road experts of the nation. That we have succeeded in doing a great deal of good for the cause, we have the assurance of hundreds of good citizens all over the country. Our subscription list has grown steadily. New names are being added daily at a rate probably never equalled by a publication of like class. In one week of December 700 bona fide subscribers were placed on our mailing list. We do not believe that any journal of similar class in the world can show a better record and we do not believe that any good roads magazine in the United States has a circulation as large as ours.

Southern Good Roads is just entering upon its career of usefulness. What we have done is not a marker for what we hope to do and what we will do. We believe that we have builded on a sound foundation. We have not catered to the advertiser, but we have devoted time and attention to studying the needs of the men and organizations on the firing line, doing active and valiant service for the cause of good roads and it is with these doers of things that our strength lies. We appreciate the support which they have given us and in the beginning of this new year, we again pledge them our earnest co-operation in every movement for the cause of good roads.

The American Association for Highway Improvement, formed at Washington, D. C., November 22nd, gives bright promise of filling the long felt need for a great national organization which will harmonize and correlate all the scattered movements in behalf of better roads. Its founders are among the most distinguished and broad minded men of the age, and the various lines of endeavor which they represent comprise a striking illustration of the universal interest and the vast economic importance of the subject of road improvement.

Better roads throughout the United States will almost immeasurably increase our producing power and will bring the producer and the consumer closer together to the advantage of both. Better roads will mean more thorough and more accessible educational facilities, and, far more important than all other considerations, they will exert a strong influence upon the young men on the farm to induce them to stay at home and give their wealth of brain and brawn toward developing the nation's agricultural resources.

The new association has a great field of work before it. Not only must it harmonize and correlate all existing agencies, but it must economize effort so that there will be no waste of energy or time or resources and no duplication of labor. We need better road laws, better administration of road revenues, more cash for road work, a more vigorous and systematic expression of public sentiment and public will. These things the association can powerfully promote. We hope and believe the great national highway association has arrived. Elsewhere in this number are found the names of the officers and directors of this great association and a synopsis of the platform on which it stands. Southern Good Roads welcomes the American Association for Highway Improvement to the field and predicts for it a career of great usefulness.

STATE AID TO COUNTIES FOR PUBLIC ROAD WORK.

The question of state aid to counties in connection with their public road work is being discussed by a great many states, and it has brought out the fact that there are many ways that a state can give assistance. State aid has usually meant a direct appropriation by the state with which to assist the counties in the actual construction of their public roads, the counties accepting such aid paying a certain portion of the cost of the public roads. In some states such appropriations have assumed large amounts as in New York and Pennsylvania, where over \$50,000,000 have been appropriated for such state aid. Of the southern states Maryland and Virginia are now appropriating certain amounts for this work, and other southern states are considering doing likewise, although the appropriations for this work will only be a few hundred thousand dollars per year. In practically all cases where this form of state aid is given, it is specified

that the roads shall be constructed under the supervision of the State Highway Engineers and shall follow locations and specifications laid down by them. Some of the states where they have not felt able to make direct appropriations for construction of roads have arranged or are planning to arrange to give to the counties engineering assistance in the location and construction of their roads, and this is a form of state aid that is needed by nearly all counties, and is of as great value to the counties as any form of state aid that could be given them. It is to the best interests of the state as well as the counties that the state should have general supervision over all public road construction in the state similar as it has supervision over all the school work, and when this is made possible in the state it will mean that the state will receive full value for all the money and labor that is raised for public work whether it is in the actual construction of the roads or in their maintenance. We believe that every state should give engineering assistance to all

its counties and have supervision over all its roads both in regard to their location and their construction.

Another form of state aid that we heartily commend is that of the state acting as bankers for the counties in procuring revenue for public road construction. As the state can borrow money at a lower rate of interest than any of its counties, and as the public roads of the state belong to all the people of the state, it is only right and just that the state should use its credit in procuring money to loan counties for public road construction, and we most thoroughly approve of the suggested legislation along this line which is recommended in this issue of Southern Good Roads.

The particular attention of our readers is called to the article in this issue on "State Aid," and all the forms of state aid recommended we believe, if carried out by the various southern states, will add very greatly to the number of miles of roads built and to the quality of the work.

The American Association For Highway Improvement

The American Association for Highway Improvement.

The American Association for Highway Improvement which was organized at Washington, D. C., November 22, 1910, bids fair to become the most powerful road organization in the world. Its purposes, according to its own announcement, are as follows:

To correlate and harmonize the efforts of all existing organizations working for road improvement.

To arouse and stimulate sentiment for road improvement.

To strive for wise, equitable and uniform road legislation in every state.

To aid in bringing about efficient road administration in the states and their subdivisions, involving the introduction of skilled supervision and the elimination of politics from the management of the public roads.

To seek continuous and systematic maintenance of all roads, the classification of all roads according to traffic requirements, payment of road taxes in cash, and adoption of the principle of state aid and state supervision.

To advocate the correlation of all road construction so that the important roads of each county shall connect with those of the adjoining counties and the important roads of each state shall connect with those of adjoining states.

The association is not designed to supplant any existing, meritorious organization or in any way interfere with the plans of such organization. It plans to bring to the aid of each the full strength of all organizations working toward the same end. No annual dues are required from associate members and all other organizations that are working for the improvement of road conditions are eligible for associate membership. Each organization can become a part of this great force for good without losing its identity, its authority or its liberty of action.

The control and administration of this association is vested in a board of directors consisting of twenty-one members and the president and vice-president of the association, and a secretary who is permanently employed as the executive officer or the instrument through which the board of directors will put into effect its decisions and conduct the work of the association.

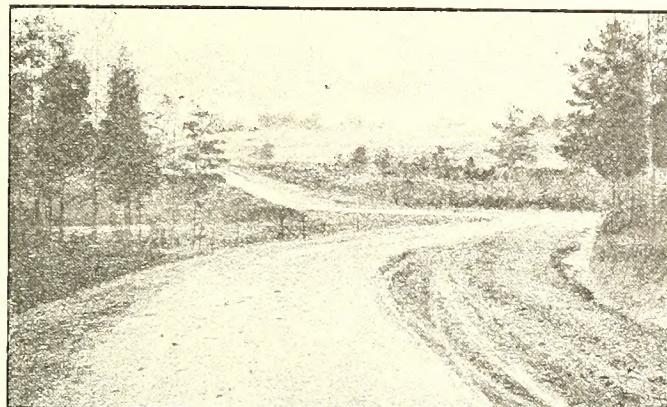
The association will assemble at its headquarters complete and accurate information concerning every road organization in the United States, all road legislation enacted, pending or contemplated, the progress of the road movement in the counties, administrative reforms introduced or contemplated, and bond issues voted or pending. In brief, the association will endeavor to keep in touch with the entire road movement in all its phases and will place such information at the disposal of its members.

The association will enlist the aid of experts from the United States Office of Public Roads and from among the successful road legislators, administrators and engineers in the various states in the preparation of model road laws in each state. It will aid legislatures in the consideration of the subject by pointing out the action of other states in dealing with similar questions, and will endeavor to bring about mutual interchange of ideas among those interested in the subject to the end that such complete facilities will be provided as to insure the passage of thoroughly practical and equitable roads laws.

In aid of commendable enterprises having for their object the betterment of public roads the association will, as its facilities develop, provide well-informed and thoroughly capable lecturers, writers and organizers, and will not restrict its efforts in this direction to the attainment of a salaried staff of assistants, but will endeavor to secure the gratuitous aid of men conspicuous for their success in all walks of life and who are willing

to aid this movement from the standpoint of broad-minded patriotism. For example, if a county is struggling with a problem of how best to provide a suitable system of improved roads, the association will endeavor to have representatives from some other county that is successfully solving the same problems give their aid to the movement by addressing public meetings or by writing an explanation of their work. Authors of state-aid legislation will be requested to appear before legislative committees to explain the intricacies of road legislation.

The officers of the association are among the leading men of the nation. They are:



Macadam Road Near Greensboro, N. C.

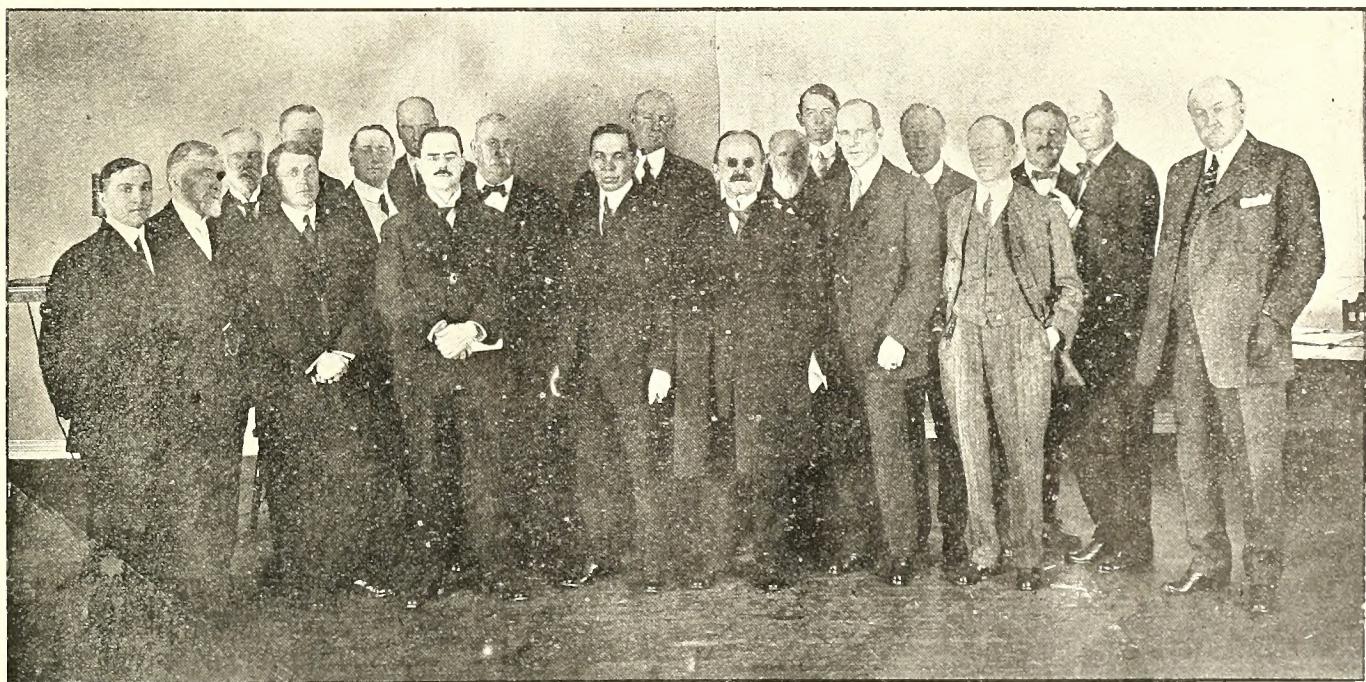
L. W. Page, President, Director, United States Office of Public Roads; J. E. Pennybacker, Jr., Secretary; W. C. Brown, Vice-President, President New York Central Lines; Lee McClung, Treasurer, Treasurer of the United States; Louis Hill, Chairman Board of Directors, President of Great Northern Railroad Company.

A glance at the names of the members of the board of directors is sufficient to inspire confidence in the organization. They are as follows:

Chairman, Louis Hill, President, Great Northern R. R.; L. W. Page, Director, U. S. Office of Public Roads; B. F. Yoakum, Chairman, Frisco Lines; Dr. E. J. James, President, University of Illinois; James McCrea, President, Pennsylvania Railroad Company; Bryan Lathrop, Lincoln Park Commission, Chicago, Ill.; John Goodell, Editor, Engineering Record; Walter Page, Editor, World's Work; Leonard Tufts, President, Capital Highway Association; Lafayette Young, U. S. Senator from Iowa, and Editor, Des Moines Capital; W. C. Brown, President, New York Central Lines; John A. Stewart, President, International League for Highway Improvement; W. W. Finley, President, Southern Railway Company; Joseph W. Jones, President, Touring Club of America; James S. Harlan, Interstate Commerce Commissioner; Lee McClung, Treasurer of the United States; A. G. Spalding, Member San Diego Highway Commission; Robert P. Hooper, President, American Automobile Association; Clarence Wilson, U. S. District Attorney, Washington, D. C.; Alfred Noble, Past President, American Society of Civil Engineers; George C. Diehl, Chairman, Good Roads Board American Automobile Association.

The ravages of the boll weevil in Texas are estimated at millions of dollars annually, but the mud hole has been a more costly foe to millions of dollars in trying to find a way of eradicating the boll weevil but we do not have to spend money to learn how to eradicate bad roads—build good ones.

The boll weevil in destroying cotton decreases production and consequently increases the price of the remaining products, but bad roads levy their deadly toll against the producer and destroy the value of the remaining roads.



GROUP OF LEADING DISTINGUISHED CITIZENS WHO ASSISTED IN THE ORGANIZATION OF THE AMERICAN ASSOCIATION FOR HIGHWAY IMPROVEMENT IN WASHINGTON, D. C., NOVEMBER 22, 1910

Reading From Left to Right: J. E. Pennybacker, Jr., E. L. Corthell, Bryan Lathrop, Leonard Tufts, Franz Quedefeld, T. H. Child, Hennen Jennings, John M. Goodell, Alfred Noble, W. D. Brown, James S. Harlan, C. G. Ambler, W. M. King, A. H. Blanchard, L. W. Page, S. A. Miles, George C. Diehl, J. C. Williams, R. W. Austin, W. W. Finley.

The Evolution of Corrugated Metal Culverts

By MR. PERRY VAN HORNE, Canton, Ohio

It is probably not generally known, but it is a fact nevertheless, that corrugated metal culverts have been in use in certain localities in the United States for over a quarter of a century.

Originally they were made with cheapness paramount, hence of very light gauge galvanized steel with no pretensions other than that of temporary, or at the best uncertain, longevity. Many of these culverts have long since disintegrated, the result of varying deter-

this in view, the use of extreme light gauge metal which had therefore prevailed, was discouraged, and increased gauges such as Nos. 18 and 16 for smaller sizes and No. 14 for the largest, were adopted as a fair standard.

Still later experiments were commenced and have continually progressed toward developing a metal on a commercial basis which should surpass steel and equal or excel, from the standpoint of anti-corrosive characteristics, the well-known old-time iron products. That metal meeting these requirements has been perfected is now a matter of common knowledge to the trade.

In recent years calculations based on the adoption of heavy gauges and materials of this superior quality, properly galvanized, have been substantially confirmed, with the natural result that corrugated culverts have continued to grow in demand, to undergo improvements and to give satisfaction. To-day they are not only recommended by Metallurgical Chemists and specified by Engineers generally, but are also in satisfactory use by the United States Government, various Foreign Governments and under the heaviest traffic-bearing railroads, city streets and country highways everywhere. And they are supplanting in a large degree all other kinds of culverts.

Up to about four years ago the common style of corrugated culverts was cylindrical and riveted. About that time a new and novel idea was evolved in a corrugated culvert made of upper and lower sections with lateral flanges, to be shipped knockdown and nested and set up by the use of bolts. This culvert was also characterized by the embodiment in its manufacture of still heavier gauges of metal than had ever before been used—including for the smaller diameters Nos. 16, 15 and 14 and for the larger sizes Nos. 12 and 10 gauge metal of special anti-corrosive properties, overcoming to a great extent the common criticisms regarding lightness and the effects of corrosion so common to ordinary steel. These better grades of heavier gauge culverts—both the round-riveted and the nestable by reason of their comparative lightness and strength and their ease in handling, hauling and installing—have accomplished much toward revolutionizing permanent road improvement.

The "Engineering News," a well-known technical journal, commenting editorially on Corrugated Metal Culverts, in its issue of January 20, 1910, had the following to say:

"To an Engineer of the old school, accustomed to build always with an eye to permanence and solidity, the idea of putting a culvert of thin corrugated iron under an earth embankment, may seem like a crude makeshift, which ought to be condemned offhand without discussion. Very likely the first use of corrugated iron for culverts was a makeshift; but experience appears to show that under certain conditions culverts of this apparently flimsy construction have made good.

"Such culverts are exceedingly cheap, are very light to transport and place, and have so much elasticity and 'come and go' that they will stay in place when unequal settlement occurs where a much heavier culvert would be cracked and broken. For temporary work such culverts are especially advantageous, as they



MR. PERRY VAN HORNE

iorating elements of the earth in which they were imbedded; others, it is claimed, are still in a fair state of preservation.

Ten years or more ago a commendable tendency was evidenced on the part of various corrugated culvert manufacturers to consider the future. They commenced to operate in the belief that corrugated metal culverts, if made of the right thickness and of a quality of metal superior to galvanized steel, could reasonably be expected to give practical and lasting service. With

are cheap to place and can be re-covered if the bank is removed.

"The rapid rusting out of sheet iron or steel exposed to the alternate wetting and drying that a culvert receives, naturally occurs as a foremost objection to corrugated iron culverts, but some of these metal culverts are said to have been in service for some fifteen years. By using a special grade of metal of high purity, the resistance to corrosion is expected to be so greatly increased that the culverts may fairly be classed as permanent construction."

A State Highway Engineer of a western state (Missouri) in a Bulletin some time since issued on the subject of "Bridges and Culverts," had the following to say regarding Corrugated Metal Culverts:

"Large quantities of corrugated metal for pipe-culverts and similar products are put on the markets, some of which give good satisfaction, while others do not. Some of the pipe, used for culverts in this state, has stood but two years, while others have been in use six times that period and are still good. * * * * A good weight and quality of corrugated pipe will last fifteen or twenty years. The difficulty is to know when you are getting a good quality, and for this reason we advise great care in buying corrugated culvert pipe. Do not buy unless you feel sure of the quality—there are all kinds on the market."

The State Highway Commissioner of an eastern state (Pennsylvania) in a Bulletin lately published on the subject of "Supervisors and Their Duties," says:

* * * * From this fact comes the corrugated metal pipe which has been on the market for several years past. If made of ordinary steel, the use of such pipe cannot be condemned too strongly, but if made of special material containing so small a percentage of impurities as to be practically pure iron, it will be found an economical investment for a township."

The sentiments expressed in the foregoing quotations have been corroborated in numerous papers and reports from time to time by the most eminent Engineers and metallurgical chemists in this country.

Dr. Allerton S. Cushman, formerly Assistant Director and Chemist, U. S. Department of Agriculture, Office of Public Roads, in a Bulletin recently published said among other things:

* * * * It seems to be a fact that carefully made metal in which the ordinary impurities are cut down to mere traces and in which the heat treatments have been carefully controlled, is much more resistant to corrosion than ordinary types of metal with a comparatively high percentage of impurities. * * * The demand for this type of metal appears to be growing, and it has been largely used for the manufacture of road culverts. * * * * The fact that this new metal has been largely specified by culvert manufacturers even at a somewhat added cost, is the best evidence that it is meeting a longfelt want in this and allied industries."

Thus it appears that corrugated culverts made of such recognized rust-resisting galvanized material as "No-Co-Ro" Metal, "American Hot Iron" and "Toucan" Metal instead of ordinary steel, and of the proper gauges, properly galvanized—giving the service that they have for years past—are recognized and accepted as a very formidable and worthy suitor for practical and general adaptability in the culvert field.

It is a safe assertion that were it possible to compile a general consensus of conscientious opinions of reliable authorities as well as laymen who have investigated the merits of these improved metals as compared with ordinary steel, the great majority would express themselves as unequivocally in favor of the complete elimination of steel in the manufacture of corrugated culverts.

If any one feature is likely to militate more seriously than another against the prospective future success and permanence of corrugated culverts—whether of steel or purer metals—it is the continued detrimental exploitation of thin gauge, flimsy material. If people will persist in buying too light weight and otherwise inferior corrugated culverts for no other reason than that they are cheap only to reap dissatisfaction as they certainly must in a comparatively short time, they should at least be fair enough to withhold judgment until they have given the better culverts a trial and not prematurely and indiscriminately condemn the various other worthy corrugated culverts, made of purer metal and heavier gauges, any of which may be bought at a reasonable price, with general satisfaction assured.

Suggested Legislation for State Aid to Counties in Public Road Work

By DR. JOSEPH HYDE PRATT, State Geologist

There are a number of ways in which a state can assist its counties in the construction of the public roads, and perhaps no phase of state aid is of more importance to the public road work than engineering assistance. While some counties have provided competent road engineers to have supervision of the location, construction, and maintenance of their public roads, the majority pay little or no attention to the need of the employment of such engineers; consequently there is needlessly wasted each year in all the southern states a large amount of money that could be readily saved to the county if it was expended under the supervision of competent road engineers. I do not believe it is putting it too strongly to say that at least one-tenth to one-fifth of the time and labor expended in the

southern states in public road work is absolutely wasted. The need of engineering assistance has been felt in North Carolina, and nearly all of the conventions that have been held throughout the state during the past year or two passed resolutions regarding this phase of public road work. The following legislation is suggested, which will enable the Highway Division of the North Carolina Geological and Economic Survey to give to the counties of North Carolina adequate road engineering assistance in the location, construction and maintenance of their public roads.

Suggested Legislation for Road Engineering Assistance to Counties

The General Assembly of North Carolina do enact:

Section 1. In order to further the work of the

Highway Division of the North Carolina Geological and Economic Survey in rendering road engineering assistance to counties in the construction and maintenance of their public roads there is hereby appropriated, out of any moneys in the Treasury not otherwise appropriated the sum of \$30,000 annually for the purpose of carrying out the provisions of this act, the same to be drawn upon as directed by the Geological Board.

Sec. 2. Any county desiring engineering assistance from the North Carolina Geological and Economic Survey shall make application for such assistance on blanks specifically prepared for this purpose to be furnished by the State Geologist and any county through its county or road commissioners accepting such engineering assistance shall agree to carry out the instructions of the Highway Engineer of the North Carolina Geological and Economic Survey; and shall further agree to construct and maintain the roads according to instructions to be given by the said engineer. Engineering assistance shall also be furnished to the counties relating to the best kind of bridge to be built



Beautiful Macadam Road Built by J. I. Case Threshing Machine Company
Between Racine and Kenosha, Wis.

in connection with the improvement of any road, and any county or township that is contemplating the construction of a bridge to cost over \$500 shall not let the contract for said bridge until the plans and specifications for said bridge have been approved by the North Carolina Geological and Economic Survey, and the final payment equal at least to 20 per cent. of the contract price shall not be paid by the county or township officials until the construction of said bridge has been approved by the engineer of the North Carolina Geological and Economic Survey. The engineer of the North Carolina Geological and Economic Survey shall also furnish to the county or township commissioners having in charge the road work an estimate of what the proposed bridge should cost, and no bid shall be accepted by said commissioners in excess of the estimate made by the said engineer, except as herein provided. If no bid is received by said commissioners at or under the estimate made by the said engineer, the letting of the contract shall be re-advertised, and if no bids are then received at or under the estimate of the said engineer the said commissioners can with the approval of said engineer accept a bid in excess of the estimate.

Sec. 3. This act shall be in force from and after ratification.

The question of working state convicts on the public

roads is one that is being agitated throughout nearly all the southern states, as well as many northern and western states; and where it has been tried, it has been decided in nearly all cases that it was in the end the best thing that could be done with the convicts. In North Carolina this question is being given serious consideration, and while conditions are somewhat different in this state, inasmuch as a large number of the convicts are sentenced directly to the public roads, in the different counties there is a much smaller number of state convicts than in many of the adjoining states. Thus in North Carolina we have only approximately eight hundred convicts, of which a certain number at the present time are needed for the care of the prison and for running the state farms. The balance of the convicts, however, that are able should be used in public road construction; and the sentiment in the end will probably be to work all state convicts on the public roads. Resolutions regarding this have also been passed by a great many of the various organizations that have held conventions in North Carolina during the past two years. The following legislation is suggested for working state convicts on the public roads of North Carolina; and it interferes in no way whatever with the present county convict road forces:

**Suggested Legislation for Working State Convicts
on the Public Roads**

Section 1. That all convicts sentenced to State Prison who are not required in carrying on the work of the State Prison and of the State farms shall be used in working the public roads as hereinafter provided.

Sec. 2. The Superintendent of the State Prison shall allot the State convicts to work on the public roads as directed by the Chairman of the State Highway Commission, if such office shall be created by the General Assembly, or otherwise by the State Geologist. When counties shall apply for State convicts to assist in the construction and maintenance of their public roads, preference shall be given to those counties which do not have a sufficient number of convicts of their own to warrant their maintaining a chain-gang for public road work. When thus allotted to the counties for such work, the county receiving such convicts for road work shall pay the cost of guarding, feeding and clothing the convicts, and this shall be done in a manner satisfactory to the Superintendent of the State Prison. Where it is considered advisable by the Highway Commission, if such Commission has been established by the General Assembly, or the Geological Board, the State convicts may be used in the construction of intercounty roads and the cost of guarding, feeding and clothing the convicts shall be paid by the Superintendent of the State Prison.

Sec. 3. This act shall in no way interfere with the present acts relating to the sentencing of prisoners to work on the roads, and which are now under the control of the county authorities.

Sec. 4. This act shall be in force from and after ratification.

Another way in which the state can very materially and advantageously assist the counties in the construction of their public roads is for the state to lend its financial support to the counties in obtaining money for the construction of public roads. The state, as we all know, can usually very readily borrow money at four per cent. interest, while the county has to pay on an average at least five per cent. on all the money that it borrows. It requires approximately one per cent.

per year on a forty year loan to provide a sinking fund which, when put out at compound interest, will equal the principal of the loan. Thus any county issuing one hundred thousand dollars worth of bonds would have to provide, besides the yearly interest, a sum equal to \$933 per year, which, put out at five per cent. interest compounded, would in forty years provide the one hundred thousand dollars principal. The county, therefore, has to provide six per cent. each year to take care of the bond issue. Now, the difference between what the state can borrow at four per cent. and the county at five per cent., i. e. one per cent., will take care of the principal of any loan when it becomes due. If the state then would borrow the money at four per cent. and lend it to the counties at five per cent., the one per cent additional interest which the county would pay to the state would take care of the principal of the bonds issued by the state; and the counties after paying the five per cent. interest semi-annually for forty years would have provided the state with an amount sufficient to pay for the principal. This would mean that all the counties would have to look after would be the five per cent interest, and would not be worried or bothered with the principal, as this would be taken care of by the state. By such a method the state would not have to advance any money on the principal or for interest, and would simply be taking advantage of its credit in borrowing money at four per cent., and giving the counties the benefit of this.

Those counties which have issued bonds and are paying interest and providing a sinking fund know that it takes approximately one per cent. additional to the interest to provide for the sinking fund.

This question and method has been very thoroughly discussed by Mr. W. S. Wilson, of Raleigh, North Carolina, in the December 11th issue of The News and Observer, of Raleigh. The following suggested legislation is recommended, which embodies this idea:

Suggested Legislation for Providing Funds for the Construction of Public Highways

The General Assembly of North Carolina do enact:

See. 1. That for the purpose of assisting the several counties composing the State of North Carolina in their construction of public roads the State Treasurer is hereby authorized and directed to issue bonds for the State of North Carolina, payable forty years after date of issue of said bonds, which shall be the first day of July of each year beginning with the first day of July nineteen hundred and eleven, to an amount not to exceed five hundred thousand dollars annually, and all said bonds shall bear interest at a rate not exceeding four per cent per annum from the first day of July of the year they are issued until paid, which interest shall be payable semi-annually on the first days of January and July of each and every year so long as any portion of said bonds shall remain due and unpaid.

See. 2. That the proceeds received by the State Treasurer from the sale of the bonds authorized in this act shall be loaned to the several counties of the State of North Carolina, as hereinafter provided, to be used by said counties in the construction of macadam, sand-clay or other surfaced roads as approved by the highway engineer of the highway department, if such is established by the general assembly, or by the highway engineer of the North Carolina Geological and Economic Survey.

See. 3. That the proceeds from sale of the bonds authorized in this act shall be allotted to the several counties composing the State of North Carolina in pro-

portion to the amount of taxes that the said counties pay into the state treasury, and any amounts allotted to counties that are not applied for by the counties for which allotted within six months after their allotment shall be re-allotted, and loaned amongst the other counties.

See. 4. The counties accepting the said loans from the state treasurer shall pay to the state treasurer each year five per cent of the amount loaned by said treasurer to said county, which amounts shall be payable semi-annually on the first days of January and July of each and every year for a period of forty years from the date of loan. Of the said five per cent paid by the county to the state treasurer, four per cent is to be used by the state treasurer to pay the state's interest on the bonds issued to cover said loans, and one per cent is to be retained by the state treasurer as a sinking fund with which to redeem the bonds issued at the end of forty years when said bonds mature.

See. 5. There shall be levied in each and every county accepting a loan or loans, as provided for in this act, a special annual tax for a period of forty years to be known as the "Road Loan Tax," which shall be sufficient to pay, and shall be used in paying, the annual interest on the loan, said interest to be paid by the treasurer of the county to the treasurer of the state of North Carolina semi-annually on the first day of January and July of each year. As collateral for said loan made by the state of North Carolina to the county, the county commissioners shall issue county bonds to the amount of said loan, and deposit same with the state treasurer to be returned to the county at the end of forty years.

See. 6. No county shall be allowed to borrow money under the provisions of this act to an amount exceeding five per cent of the assessed valuation of the property of the county.

See. 7. Any county accepting a loan under the provisions of this act from the state of North Carolina shall expend this money in the construction of macadam, sand-clay or other surfaced roads, which shall be located, constructed and maintained under the supervision of the Highway Engineer of the Highway Department, if such is established by the General Assembly, or the Highway Engineer of the North Carolina Geological and Economic Survey.

See. 8. That the bonds authorized and directed to be issued by section one of this act shall be coupon bonds and of the denomination of five hundred dollars (\$500) and one thousand dollars (\$1,000) each, as may be determined by said State Treasurer and sealed with the great seal of the State. The coupons thereon may be signed by the State Treasurer alone, or may have a facsimile of his signature printed, engraved, or lithographed thereon; and the said bonds shall in all other respects be in such form as the said State Treasurer may direct, and the coupons thereon shall, after maturity, be received in payment of all taxes, debts, dues, licenses, funds and demands due the State of North Carolina of any kind whatsoever which shall be expressed on the face of said bonds. Before selling the bonds herein authorized to be issued, the Treasurer shall advertise the sale and invite sealed bids in such a manner as in his judgment may seem to be most effectual to secure the best price. He is authorized to accept bids for the entire issue or any portion thereof, and where the advantages are equal he shall give the preference of purchase to the citizens of North Carolina; and he is authorized to sell the bonds herein authorized in such a manner as in his judgment will produce the best price.

See. 9. The said bonds and coupons shall be exempt from all State, county or municipal taxation or assessment, direct or indirect, general or special, where imposed for purposes of general revenue or otherwise, and the interest thereon shall not be subject to taxation as for income, nor shall said bonds and coupons be subject to taxation when constituting a part of the surplus

of any bank, trust company, or other corporation.

See. 10. It shall be lawful for all executors, administrators, guardians, and fiduciaries generally to invest in said bonds.

See. 11. This act shall be in force from and after its ratification.

Good Roads Notes Gathered Here and There

Alabama.

There is no southern state today in which at some time or other polities has not predominated to the detriment of everything else. It can be safely said, however, that this condition has changed entirely and Alabama is one of the leaders in this new order of things. What was said of Dallas county, one of the leading counties of the state recently, is true in a large measure of the entire state. It is as follows:

"Dallas county is usually closely associated with polities but the time is fast approaching when the balance of the state is going to look to it for lessons in other lines. Its citizens are beginning to study the signs of the times industrially and commercially as they have never done before. The best indication of this is found in the intense interest that is being taken in the good roads problem. Without any opposition

authorities and is being highly endorsed by the individual citizens of the county as well as the officials. Practically all the main roads in the county, including 100 miles or more, have been put in good condition.

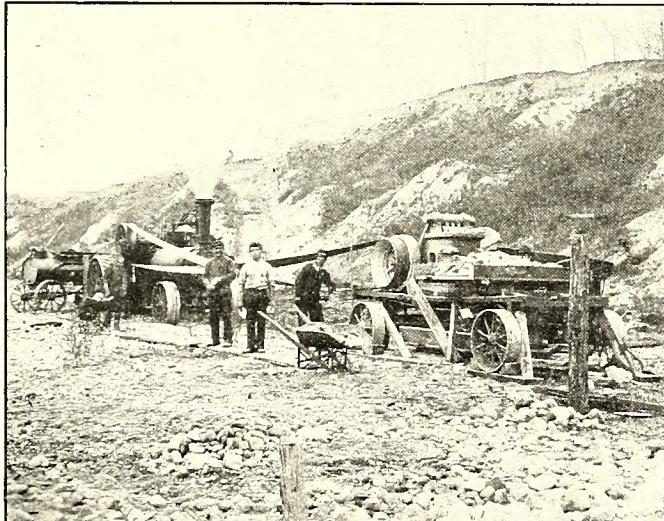
The path finding automobile party representing the Atlanta-Jacksonville national highway, traversed the county from north to south, pronouneing it one of the finest and best maintained roads in south Georgia and as good as any in the state. The entire citizenship of the county realize the importance of good roads and are assisting the commissioners with every encouragement in the building of these highways, realizing that all property values touched by these highways, have been enhanced several fold.

Troup county, which voted \$200,000 of bonds a short time ago, is taking steps toward having the work begun at once. Competent engineers are at work on plans for the roads.

Recently Hon. S. W. McCallie made a tour of the state, traveling over 1,100 miles of roads and in his report to the advisory board of the Georgia Economic Survey, he said: "I must say that I was much gratified, indeed, with the splendid progress of road building, especially in south Georgia. Roads in that section, on which automobiles can now make 30 or more miles an hour were well nigh impassable at the time of my former visit. I recall that some fifteen years ago it took nearly an entire day for my light camp wagon, drawn by two stout horses, to make the trip from Whigham to Bainbridge, whereas the automobile tourists made the trip in less than 40 minutes, and yet this road is much inferior to miles and miles of public roads recently constructed throughout the wiregrass section of the state. Hand in hand with road improvement of the section is to be noted improvement in agriculture and all other phases of development which go to make up progressive and prosperous counties."

In the Cracker State good roads and prosperity are synonymous. The county that has them is prosperous. The county that has them not is not prosperous. The Dahlonega Nuggett, published in Lumpkin county, one of the most progressive, said recently: It is a rare thing for us to pick up a paper, even where they have their automobiles and good roads, and not find some property advertised by the sheriff each month. Yes, in the good old county of Jackson, and down in Oglethorpe where they make large amounts of cotton, the sheriffs sell much property. For the January sale in Oglethorpe we notice where the sheriff has two farms to offer, ten bales of cotton, besides 15,000 pounds of seed cotton. While here in Lumpkin there are none, and more than this, eight months of 1910 have passed without the sheriff having anything even advertised to sell.

Recently a Sumter county paper told of two loads of cotton, one of forty bales, weighing 22,000 pounds and one of 30 bales weighing 16,000, being brought to



J. I. Case Threshing Machine Company Crushing Stone to Build the Sheridan Drive, Using Their Own Machinery

from any source the county court of revenue is receiving cordial support in its endeavor to cover the entire county with a most modern and up to date system of good roads. It has been said that when a people are willing to go down in their pockets to support any public movement that it is bound to succeed. Dallas county citizens have proven, by voting for the necessary bond issue, that they are willing to go down in their pockets to secure good roads.

* * *

Georgia.

In the state of Georgia a number of counties are trying out the plan of working convicts on the county roads and are delighted with it. In Crisp county, where forty convicts have been building roads for some time, the system has proved satisfactory to the county

Américus over the good roads of that county. Good roads pay the farmer.

* * *

Indiana.

The Indian delegates to the good roads congress held in Indianapolis last month put the matter of road-building squarely up to the state legislature in the following resolution, adopted by the hundreds of delegates present without a dissenting vote:

"Resolved, That the Indiana members of this convention are in favor of such good roads legislation by the next general assembly as will provide for a state highway commission and state and county aid for the construction and maintenance of principal roads for the state; of a graduated automobile and vehicle tax, the proceeds to be used for the purpose of maintaining the highways of Indiana; of the use of state, county or municipal prisoners who have been convicted of crimes or misdemeanors in the preparation of road material and the construction and repairs of highways."

* * *

Kansas.

Kansas is on the good roads band wagon good and plenty and it means to stay there. At the coming session of the state legislature a bill will be introduced providing for the working of the state convicts on the public roads and providing also for a grand system of public roads traversing the state north and south, east and west.

The first road to be built would likely be the one running across the state from Hutchinson to Kansas City and Leavenworth. The Reformatory inmates could work eastward from Hutchinson and those at the state prison could be worked south and westward until the road is completed.

The road from Hutchinson to Kansas City would follow the New Santa Fe Trail, which is the pioneer good road movement of the state, and the Trail association will actively boost for it. This road would pass through Burton, Halstead, Newton, Walton, Peabody, Florence, Strong City, Cottonwood Falls, Emporia, Waverly, Ottawa and Olathe.

Three other state roads are contemplated and will be built if the bill is passed, but these named will be built first.

* * *

Michigan.

H. S. Earle, former state highway commissioner, has a new good roads scheme which he would like to see adopted in Michigan. In brief, it is a project for connecting all the county seats throughout the state with a net work of modern well-built highways by means of the co-operation of state and county governments. The project will be presented to the next legislature in the form of a bill, and will be urged for passage. Mr. Earle says Governor-elect Osborn has given it his support.

It is proposed under this plan, to have the county highway commissioners in contiguous counties meet and outline a route for a proposed inter-county seat highway. The route agreed on would be presented to the state highway commission or commissioner, as the case might be, for approval. When it was approved the counties would be entitled to state aid to the extent of 50 per cent of the cost of the improvement.

It would be provided that the state would not go in debt for advancing this work, but that only such money should be used for it as the legislature saw fit to raise by taxation from year to year. The plan does

not contemplate any extravagant splurge by the state, but has in mind the intelligent direction of highway improvements so that in time there would be a network of roads connecting all the principal cities and towns in both peninsulas.

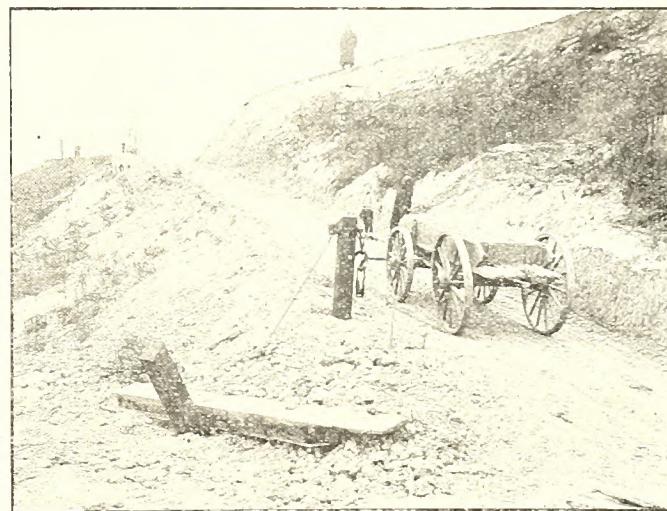
Under this plan the poorer counties would be encouraged to take up the good roads movement. It is pointed out that under present conditions many years are bound to elapse before there will be modern highways between some important counties, as in many cases, like Houghton and Marquette for instance, a poor county lies between, and it is not inclined to build a highway for the benefit of the two cities.

Every southern state would do well to study the plans herein outlined and see what can be accomplished along similar lines. Mr. Earle is one of the most eminent road experts of the nation and any plan that he advances is worthy of note.

* * *

Missouri.

An unique road association was formed at Carthage, Mo., last month. It is known as the "365 Day Road Association" and is composed of real, active, everyday workers. It has no place for drones and there are none allowed in the hive. The membership is divided



J. I. Case Threshing Machine Company Building an Extension of the Sheridan Drive, North Out of Chicago

into two classes—those who pay a membership fee of \$5 per month and those who pay \$2.50 per month. At last accounts there were 108 members of the \$5 class and this list was growing daily. The list of \$2.50 per month members will probably reach 200. From all accounts, the association is doing a great deal of good. The members are full of enthusiasm and are determined to get results.

* * *

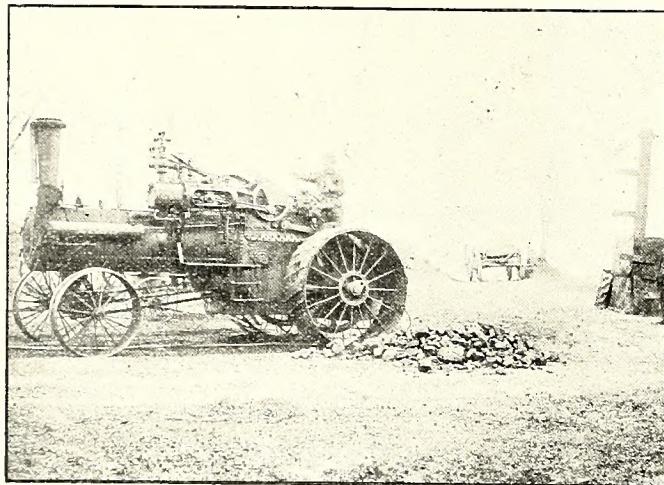
North Carolina.

Some idea of the good roads sentiment in the Old North State may be had from the following news dispatch sent out from Raleigh December 14:

Dr. Joseph Hyde Pratt, State Geologist, and secretary of the North Carolina Good Roads Association, here to-day, says the movement for the organization of county good roads associations to co-operate with the state association is progressing finely, there being now organized and actively at work, twenty-seven of these county associations, with arrangements made for the organization of many others in the near future. As an

indication of the rapidity with which this work is being advanced, Highway Engineer W. L. Spoon is today in Randolph county organizing an association. He organized one in Gaston county yesterday, and will be in Rockingham tomorrow for the organization of a Richmond county association. On Friday he and Dr. Pratt will participate in the organization of an association in Mecklenburg county; also one in Wadesboro, for Anson county, Friday. Then, on December 22, there is to be an association formed for Madison county; January 2, one for Duplin county, and on January 9, one for Pender county. Other dates are being asked for by counties yet unorganized, and it looks as if it will be only a short while now before practically the whole state will be covered by these county associations, co-operating for the furtherance of highway construction on a systematic basis.

In Macon county Mr. T. M. Greene, president of the good roads association of the county called a mass-meeting for December 17 for the purpose of talking over the road situation and putting the matter up to the newly elected member of the legislature and the



J. I. Case Road Roller Hauling Rock Up Hill With Cable and Pulley Arrangements, Using the Same Engine That is Used in Crushing Stone

senator of the district. This example should be followed by every good roads organization in the south. The people will not get the legislation they want until they demand it.

Oklahoma.

In Oklahoma good roads fever is epidemic. Every section of the state has it and many counties have already voted heavy bond issues for road improvement. The movement to construct two great highways across the state from north to south and from east to west, continues to grow in favor. Tulsa county will build a complete system of macadam roads and there is a movement to build a macadam highway from Tulsa north through Tulsa and Washington counties connecting with a road from Kansas City, Kan.

While no definite action has been taken looking to the construction of the thoroughfare, it is known that the citizens of Montgomery county, Kan., Washington, and Tulsa counties, in Oklahoma, are anxious to have the road built and as soon as it is possible. It is realized that this will be but a feeder for more roads and with the trunk line, as it might be called, passes the length of Tulsa county, forty miles in length and will be a feeder for any other road improvements east and west.

Washington county is a fraction less than ten miles wide while it is forty miles in length. With the proposed road running north and south through the center of the county, or nearly so it would not cost much to build feeder roads east and west and Washington county would then have the model highway system of the state.

* * *

Oregon.

The road problems of Oregon are troublesome. There is no state in the union in which population and taxable values are so unevenly distributed and this makes a uniform road law almost an impossibility. Just now there is a concerted movement for the appropriation of \$340,000 by the state for aid in the construction of local highways in every part of the state. It is planned to divide this fund equally among the 34 counties of the state, \$5,000 yearly to be available in any county that raises \$20,000 to be used with the \$5,000 of state money.

The bill as drawn plainly contemplates the expenditure of this \$340,000 on local roads. It reads:

After having so provided such fund, the county court shall select the particular location of the road to be constructed and shall designate the place of beginning and definitely describe the location of the road, all of which shall be on the journal of the court. Such road shall begin at the principal market place in the county, or shall connect with a permanent road leading to such place, and shall be so located as that when constructed, as herein provided, it will constitute one of the main traveled roads to the place whence it starts.

In other words the sum of \$340,000 of state funds is to be expended in improving roads leading from numerous points in each county to the principal market place of that county.

In a number of sections the good roads people are contending that the state should go further and spend a dollar for improved roads for every dollar the counties spend. There is no telling how the problems that face the state will be worked out, but the interest in improved roads is so general and active that something will be done. The first meeting of the Oregon Good Roads Association was held December 18 and it was largely attended by the leading men of the state.

* * *

Pennsylvania.

The good roads movement which was started in the upper end of York county, Pennsylvania, about four years ago has been finished. It has cost the state, the county of York, the boroughs of Wellsville and Dillsburg and the township of Carroll, Warrington and Washington more than \$100,000. Each mile of the improved road built has entailed an expenditure of \$10,000.

Though the burden has been heavy, no word of complaint or dissatisfaction comes from the people of that section. The roads, though costly, have added much to the taxable values of the section, have brought prosperity and contentment and are cheap at the price.

* * *

Tennessee.

There is a great deal of interest in Tennessee in the building of improved roads and the use of the convicts on the roads and it looks like something will be accomplished in Tennessee. Before the November election every candidate and every faction asserted vociferously that they favored good roads and would work for them and the press of the state is calling on them to live up to pre-election promises.

Capt. Ben W. Hooper, governor-elect of Tennessee, is enthusiastically in favor of good roads. Recently he suggested the building of a state highway from Bristol to Memphis. He thinks this could be done in one day by the plan recently adopted in Iowa, when a 380-mile cross-state highway was built from river to river in a day without a cent of cost to the state.

The distance between Bristol and Memphis is about 500 miles. There are good roads already for a considerable portion of the way, and only a few connecting links would be needed here and there. With the same sort of system and co-operation that was shown in the Iowa enterprise it would be possible to carry out Capt. Hooper's suggestion. The preliminary work could be done by private subscription, and when everything is ready for the final effort there might be an unbroken string of roadbuilders from the extreme northeast of the state to the extreme southwest. The Nashville Tennessean believes the plan is feasible, and adds a few suggestions of its own as to other highways:

"After connecting Bristol on the northeast with Memphis on the southwest we can then in the same way build another highway from Reelfoot Lake on the northwest to Ducktown on the southeast.

"When these main routes from east to west shall have been built, several highways, running north and south, clear across the state, will be comparatively easy. We imagine that Kentucky on the north and Alabama on the south should be enlisted in a plan connecting Louisville, Nashville and Atlanta, the old roadbed of the Louisville and Nashville pike being used on which to build the new public highway."

Active work is to be begun on the Memphis-to-Bristol highway and Messrs. W. M. Cassedy, president; A. W. Wills, vice-president; George A. Gowan, secretary-treasurer, and Hamilton Parks, attorney, are the officers of the "Memphis-to-Bristol Highway Commission," which will be incorporated to further the building of this up-to-date road straight across the state of Tennessee.

West Virginia.

In West Virginia the good roads sentiment is gaining ground steadily. Mingo county has just voted bonds for \$150,000 for the building of roads. McDowell



HON. P. ST. JULIAN WILSON
State Highway Commissioner, Richmond, Va.

county is soon to vote on a \$200,000 bond issue for the same purpose and there is every prospect of the issue being voted. In Mercer county there is an agitation for an issue of half a million dollars to supplement with macadam roads the paved streets of such hustling business centers as Bluefield, Princeton and Bramwell.

Good Roads Notes in Brief

Precinct No. 2, Caldwell county, Texas, has voted \$10,000 bond issue for the building of roads.

Chattanooga, Tenn., is considering voting \$100,000 of bonds for paving streets.

Hardin county, Texas, will vote on January 11, on a bond issue of \$100,000 for good roads.

Russell county, Virginia, will vote on a bond issue of \$300,000 for good roads in the near future.

Stewart county, Ga., is considering a bond issue of \$100,000 for the improvement of roads.

Wood county, W. Va., is contemplating spending \$190,000 in building roads in the Parkersburg district.

Columbia, S. C., has contracted for the paving of Washington street with asphalt.

Dallas, Texas, is to have the remainder of Houston street paved and Main street will be treated with bituminous at a cost of \$30,000.

Aberdeen, Miss., will spend \$50,000 on street and other improvements.

Mecklenburg county, Va., is to build thirteen miles of macadam road near Clarksville.

Elmore county, Ala., has engaged competent road engineers to grade and lay out a road system to be built at a cost of \$170,000.

It is announced from Denison, Texas, that the Southwestern Surety and Insurance company will build 65 miles of macadam. \$250,000 is now available for the work.

Dade county, Fla., has awarded a contract for the building of nine miles of road at a cost of \$2,000 per mile.

Orange county, Fla., defeated a bond issue of \$1,000,000 for the construction of 100 miles of brick roads.

West Palm Beach, Fla., defeated a bond issue of \$20,000 for street improvements.

Dublin, Ga., has voted \$30,000 of bonds for street work.

Copiah county, Ga., has voted \$75,000 for road improvement.

Winn county, Louisiana, has voted a big bond issue for improving the roads of the county.

Lincoln county, Miss., has voted to build \$150,000 worth of improved roads.

Palatka, Fla., will build twelve miles of concrete sidewalks.

Birmingham, Ala., has awarded a contract for bituminous paving amounting to \$225,524.

Fairfax county, Va., is planning to construct a macadam highway from Fairfax to Washington, D. C. About \$42,000 is now available for the work.

Brooksville, Fla., will spend about \$10,000 on street improvement in the near future. There is to be a bond election to raise more funds on January 17.

Elizabeth City, N. C., will pave several streets with asphalt, brick and Belgian blocks during the coming year.

Nashville, Tenn., begins in this month the construction of the "Capitol Boulevard" for which \$12,000 has been appropriated.

A number of steel bridges are to be built across the Flint river between Sumter and Crisp counties, Georgia.

It is rumored that the Atlantic Coast Line will construct a gigantic steel and concrete viaduct at Wilmington, N. C., to cost in the neighborhood of \$350,000.

There is much bridge-building in Virginia. The state highway commission has been asking for bids for bridges at Amelia, Critz and Jetersville.

Gulfport, Miss., will build 10,000 yards of concrete sidewalks.

Pine Bluff, Ark., will spend \$43,000 on repairing ten miles of gravel roads and the bridges and culverts along the roads.

Bids are being asked for the construction of a macadam road to cost not more than \$50,000 from Tanners Cross Roads to Ocean View in Norfolk county, Virginia.

Dallas county, Ala., has awarded a contract for the construction of 32 miles of graveled roads.

The city of Dallas, Texas, has voted \$350,000 of bonds for street improvement.

Lee county, Virginia, a comparatively small and weak county, voted \$364,000 of bonds for good roads last month.

Canadian City, Texas, has voted bonds for street-building.

Scott county, Virginia, voted a \$300,000 bond issue for roads December 14. A week later Smyth county voted \$50,000 for improving the roads in the Rich Valley district.

Wichita Falls, Texas, will vote at an early date on an issue of \$60,000 of bonds for better streets.

New Orleans, La., has awarded contracts for improving streets amounting to \$85,000.

Greenville county, S. C., will build thirty miles of fine macadam road between Greenville, S. C., and Hendersonville, N. C. It is to be thirty feet wide and all bridges and culverts will be of concrete.

It is announced that Charles B. Moling Company, of Austin, Texas, will build two hundred miles of improved road around Lake Charles, La.

Montgomery, Ala., one of the south's most progressive cities will pave seven blocks of Madison avenue with bitulithic.

Norfolk county, Va., has adopted the system of keeping the roads and bridges of the county in repair by the contract system. The county recently advertised for bids.

Tulsa, Okla., recently advertised for bids for building seven miles of asphalt and brick paving.

BRIDGES AND CULVERTS.

Birmingham, Ala., and the railroads entering that city, have come to an agreement relative to the construction of certain viaducts and road ways affected by

the building of the viaducts. The roads will pay out about \$1,000,000 and the city will pay \$125,000.

Hart county, Ga., defeated a bond issue for bridges and improved roads recently.

Anderson county, S. C., and Hart county, Ga., are contemplating the erection of a bridge across the Savannah river, to cost \$27,000.

Burham county, N. C., will build a concrete bridge across the Eno river.

Houston, Texas, will vote January 11 on a bond issue of \$500,000 to build a viaduct and bridge across Buffalo and White Oak bayous.

A bridge is to be built across the Ohio river, connecting Wellsburg, W. Va. and Brilliant, Ohio, costing about \$400,000.

Springfield, Mo., defeated a bond issue of \$100,000 for improvement of streets and the building of bridges and viaducts.

Muskogee county, Okla., has been advertising for bids for the construction of 33 bridges for which \$150,000 of bonds have been voted.

Columbia township, Richland county, S. C., will vote on a bond issue at an early date for the purchase of certain bridges across the Congaree and Broad rivers. The amount of the issue will be \$75,000. There is a well-defined movement to build new bridges instead of buying the old ones.

A contract has been awarded for the construction of a 1,200 foot bridge across the Catawba river between York and Lancaster counties, South Carolina.

Menard county Texas, will vote on February 7, on a bond issue of \$20,000 to build a bridge across the San Saba river.

Richmond, Va., asks for bids on a bridge across the James river, connecting Manchester and Richmond, to cost not more than \$225,000. Bids will be opened February 1.

Lynchburg, Va., will build a bridge across James River to cost about \$300,000. It will be 1381 feet long, have a 30-foot drive way, 7-foot walks on each side and car track in the center.

Ohio county, W. Va., will build a concrete bridge over Woods Run, near Wheeling.

Johnson county, Mo., has awarded contracts for the construction of 30 steel bridges, half of which are to have concrete floors and half wood floors.

Cumberland county, N. C., will construct a bridge 65 feet long and with twelve foot roadway over one of the streams of that county.

Tulsa county, Okla., has awarded contracts for the construction of eight reinforced concrete bridges.

Spartanburg county, S. C., is asking for bids for the construction of two bridges.

Knoxville, Tenn., will erect a reinforced concrete bridge over the tracks of the Southern railway on Gay street.

Fort Worth, Texas, is to vote on a bond issue of \$1,000,000 for a number of improvements, including improved streets, three bridges, improving and repairing old bridges, culverts, etc.

Mattoaca, Va., is to build a \$10,000 steel bridge across the Appomattox river to connect with Dingwiddie.

Calhoun county, W. Va., is to build a 235 foot steel bridge across the Little Kanawha river at Grantsville.

Tuscaloosa, Ala., will improve streets, and build new bridges and culverts in the near future, it is reported.

Southern Appalachian Good Roads Legislative Committee

At the annual meeting of the Southern Appalachian Good Roads Association which was held at Knoxville, October 5th and 6th, the following resolution was passed:

"Resolved, That this convention appoint a committee from the states comprising this association, each state having representation, whose duty it shall be to investigate the statutory road laws of their respective states, find the defects of said laws, and make such recommendations tending to eradicate these defects, and recommend such amendments to their respective legislatures, as to them seems proper and expedient, or, in their discretion, make a concerted recommendation with such minor exceptions as local conditions would demand, said report of reports to be made as soon as practicable."

It was decided by the convention that the president of the association should appoint this committee and the following have been appointed from the several states to serve as members of this committee:

VIRGINIA—Hon. P. St. J. Wilson, Chairman, Richmond; Mr. J. H. Marsdetta, Roanoke; Mr. H. Hocutt, Roanoke.

NORTH CAROLINA—Hon. M. L. Shipman, Chairman, Raleigh; Dr. C. P. Ambler, Asheville; Hon. John H. Small, Washington.

SOUTH CAROLINA—Hon. F. H. Hyatt, Chairman, Columbia; Mr. John Wood, Spartanburg; Prof. F. H. Coleoek, Columbia.

GEORGIA—Hon. S. W. McCallie, Chairman, Atlanta; Prof. C. M. Strahan, Athens; Mr. H. W. Smith, Atlanta.

TENNESSEE—Mr. Cyrus Kehr, Chairman, Knoxville; Mr. W. T. Hale, Morristown; Mr. Henry R. Brown, Greenville.

KENTUCKY—Hon. Joseph F. Bosworth, Chairman, Middleboro; Prof. Walter E. Rowe, Lexington.

There are a great many questions that can be discussed to very great advantage by this legislative committee as a whole and by the sub-committees in each state. Certain subjects that can be taken up for discussion are brought out very emphatically in a letter recently received from Mr. Cyrus Kehr, president of the Knox County (Tennessee) Good Roads & Park Association.

"My dear Dr. Pratt:

"The fact that the legislature of the state of Tennessee will soon convene and will afford an opportunity for the enactment of legislation relating to roads prompts me to inquire whether action has been taken upon a resolution passed by the convention of the Southern Appalachian Good Roads Association for the appointment of a legislative committee.

"It is self-evident that such a committee as is contemplated by this resolution can be of very material aid to all persons and local organizations in the various Southern Appalachian States desiring to attain the best in new laws or in the amendment of laws already in force.

"If this committee has not yet been appointed I take leave to suggest that it be done as soon as practicable, five or seven persons being appointed in each state, with one member at large to serve as chairman.

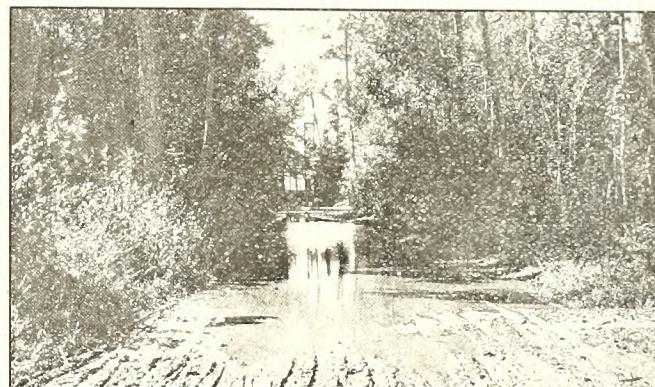
"Progress might promptly be made if copies of available material force were at once sent to all members of the committee. Such material might include pertinent publications by the Public Roads Office of the Department of Agriculture, Washington, D. C., bulletins, etc., of the Southern Appalachian Good Roads Association, the road laws of the several Southern Appalachian states, bills heretofore pending, but not yet passed, in the several legislatures, and bills and suggestions for bills or portions thereof submitted by interested persons and organizations. In this connection a general invitation might be extended for the submission of bills or portions thereof with written arguments thereon.

"As you well know, a large variety of points or topics are open for discussion in this connection. I suggest the following:

"Shall the state pay the entire expense of the construction of some roads?

"Shall the state pay a portion of the expense of all roads, the remainder being paid by the counties?

"Shall a portion of the construction of all roads be paid by special assessment upon the lands abutting upon and lying near the roads, the remainder being paid by the county or by the county and state jointly?



Sand Road Near Allendale, S. C. United States Object Lesson. Before Improvement. This Road is at Its Best Now. They Claim It Gets Bad in Wet Weather

"Shall the construction of all roads be paid by special assessment upon the lands abutting upon and lying near the roads?

"Shall provision be made for the issue of state bonds for road construction?

"Shall provision be made for the issue of county bonds for road construction?

"Shall such a bond law be passed for each county, or shall there be a general law under which any county may proceed to make such issue of bonds?

"Shall the proceeds of bonds be used for construction only or for both construction and maintenance?

"Shall a definite tax levy be made from year to year to create a sinking fund which shall equal the face of the bonds at maturity or shall it be left to the county authorities to determine in future whether the bonds shall be paid or refunded by the issue of new bonds?

"Shall the proceeds of bonds be used only for building macadam roads or shall the county authorities be

allowed to exercise discretion as to the kind of road?

"Shall there be a state department or bureau of roads through which all the counties of the state may receive competent assistance regarding road construction?"

"Shall all of the road work of every county be put under one competent supervisory head? To what extent shall provision be made for the use of convicts in the construction of roads and the preparation of road materials, tools, and machinery?"

"Shall the law limit the county authorities to the construction of new roads by contract only? If convicts are employed in road building, shall this be done through contracts or under the supervision of county or state authorities?"

"Shall definite preference be given to main roads leading from the county seat of one county to the county seats of adjoining counties?"

"If state aid is not given to the building of roads generally, shall such aid be given to direct roads connecting the county seats of adjoining counties?"

"This is not intended as a statement of all the subjects which should be thus discussed."

"Perhaps this committee could first deal with this material by correspondence exchanged through the chairman and afterwards hold a meeting for preparing and issuing a report to be made available to all interested persons and bodies."

These suggestions of Mr. Kehr are very good and some of them are already being discussed by the Tennessee and North Carolina Good Roads Association. There was published in the November issue of Southern Good Roads a suggested bill for the creation of a State Highway Department in North Carolina, and this act should be applicable to other states. There is published in the present issue other suggested legislation for North Carolina. Other states that are considering new legislation regarding public roads should send copy of this for publication in Southern Good Roads, so that all those in the Southern Appalachian states interested in good road legislation could have the benefit of knowing what is being done in other states. It is the desire of the president of the Southern Appalachian Good Roads Association that the men who have been appointed on the sub-state committees on legislation will correspond with each other, and take some action regarding road legislation in their states.

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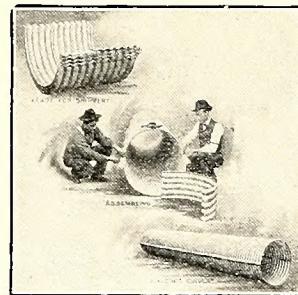
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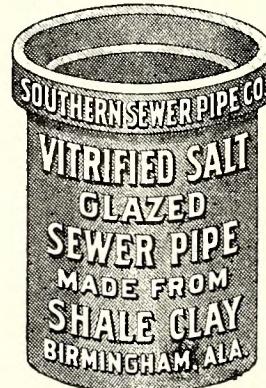
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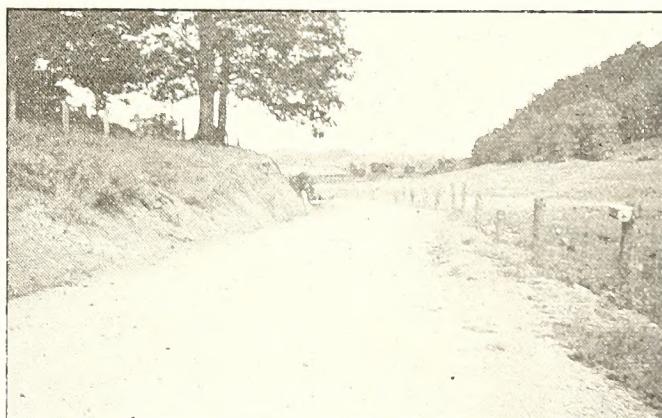
Good Roads and Conservation

By DR. JOSEPH HYDE PRATT, State Geologist

There is a very close relation between good roads and the successful carrying out of the principles of conservation; in fact, the construction of good roads is one phase of conservation. In the first place, conservation, as applied to our natural resources, means not only their preservation and conservation but means also that we will be able to utilize them perpetually. The problems relating to the conservation of these resources are not local but national and state questions; they are questions that affect and are of interest not only to the individual but to the whole people, and, therefore, in adopting measures looking toward the conservation of these natural resources the nation must be considered before the state and the whole people before the individual. This does not mean necessarily that the federal government shall control and dominate all policies relating to conservation; although, personally, I believe that this would be the very best step that could be taken for the most successful accomplishment of all measures relating to conservation. It does mean, however, that the federal government should have at least some supervision in the carrying out of these policies, so that what is done shall react to the good of all the states and not simply to the individual state and often to the disadvantage of adjoining states. There are so many questions coming up relating to conservation that cannot be applied to the individual state, and the accomplishment of the desired results can only be obtained when they are considered as interstate problems. To illustrate, you might take the question of the protection of forests from fires: one state may pass most rigid laws relating to the protection of its forests from fire and yet the adjoining state may give no protection at all to its forests, and forest fires, starting in this state, gather great headway so that it is almost impossible to prevent their crossing the imaginary state line and doing a great deal of destruction in the state which has rigid fire laws that are being enforced as far as that state itself is concerned. Such a condition can, and does, exist in the Southern Appalachian region; and unless all the states will take up the question of fire protection for their forests, there will always be more or less destruction of the forests near the borders of these states from fires that have originated in adjoining states.

Another illustration of the need of some federal supervision is in the protection of mountain trout from destruction on account of sawdust that is thrown into many of our streams. Many of our mountain streams flow from one state to another and from one county to another, and it has very often happened that a number of counties of a state on the lower waters of a stream have passed rigid laws regarding the throwing of sawdust in these streams and yet the counties higher up on

these streams have no such laws, and their lumbermen are allowed to throw sawdust in the streams, with the result that the counties lower down, who have the rigid laws against throwing sawdust into the streams, derive no benefit whatever from these laws as their streams are filled with sawdust from the counties above. This can also be true where the streams flow from one state to another; one state, on the lower waters of a stream, may have laws against throwing sawdust or other deleterious material into the stream, while the state which contains the upper waters of the streams may have no such laws whatever, and thus the first state loses all of the benefit that its good laws should give.



Macadam Road in Russell County, Virginia. This is an Example of First Class Construction

This is also true in regard to the conservation of water-powers. One state will pass laws for the conservation and protection of its water-powers, and yet the sources of the streams are within another state which is doing nothing whatever to protect its water supply, and thus the water-powers in the other state are largely decreased in power on account of the lack of protection in the state where the streams originate.

From the above it can readily be seen that there should be federal supervision for carrying out the principles of conservation that are interstate in their benefits and decidedly state supervision in connection with the conservation of the natural resources of the various counties composing the state.

Every state should be interested in the development of every other state, for no advancement can be made in any one without its being directly or indirectly a benefit to all the others.

We should carry the question of conservation further than its application to our natural resources and apply

its principles to the preservation of the health of our people and the conservation of their labor, time and wealth, and this latter view it will be found is fully as important as the first. We will find that good roads play a more important part in the carrying out of this latter phase of conservation than perhaps it does in the first.

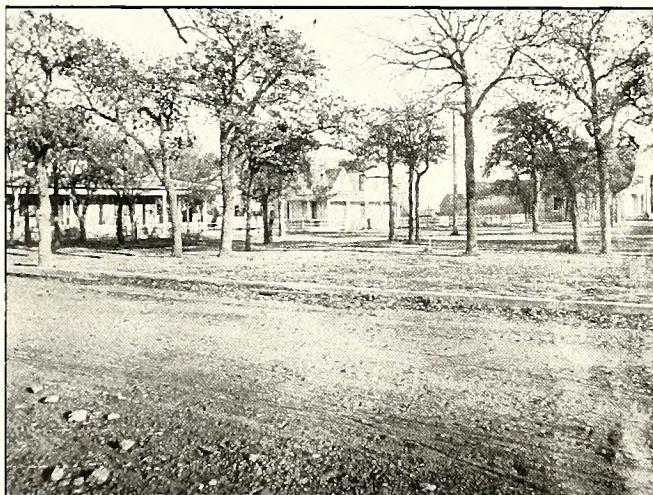
Under the head of natural resources we would have: (1) Soils, (2) Forests, (3) Water-Powers, (4) Products of the Sea.

The development, and even the life, of this nation is dependent upon these natural resources, and while some of them are of less importance than others, yet the best and healthiest growth of the nation is dependent upon the conservation of all of them. When one stops to consider that the population of this country is now increasing at the rate of about one-fifth of its total population each ten years, one begins to realize how many more millions of people must be fed and clothed from the products of the soil. By the middle of the present century it is estimated that there will be about one hundred and fifty million people in the United States. This increase is not confined to any one state

soil, and his interest will increase in the ratio that we improve the social condition of farm or rural life, and it is in this connection that we will find that good roads play a very important part, in improving their condition. Good roads will do more toward improving the social condition of rural life than any other agency that can be inaugurated. At the present time it is possible for the people of our rural sections to have many of the economic advantages and conveniences of the city, such as hot and cold water in their houses, lighting and heating systems equal to any in the city, and telephone connections, and at little or no more cost than these same conveniences would cost in the city. Rural mail carriers now deliver mail to the citizens of our rural sections from once to twice a day. Yet with all these conveniences, which many of us now deem absolutely essential and necessary, the farmer, if his home is connected with that of his neighbor and with town by a bad road, is handicapped in his financial and social development, and these many conveniences that have improved his home life lose a great deal of their value in improving the social condition of the community. It is surprising to note the wonderful uplifting effect that good roads have in a community that has been accustomed for generations to bad roads. It means that houses will be painted, fences will be repaired, flowers and shrubs planted in yards, and, in a number of instances where chicken coops and pig pens were in the front yard, they have been removed to a less sightly place in the rear of the yard, and it is due to the fact that a good road has been constructed by that farm.

At the present time there is a great deal of thought being given to the problem of keeping the young people, especially the young men, on the farm. Personally, I believe that the construction of good roads throughout the farming sections of our country will do more than any other one thing to keep these young men on the farm. I do not wish to give the impression that I believe that all young men who are raised in the country should remain there, for there are many young men who are raised on the farm who are specially equipped to become doctors, lawyers, ministers, engineers and business men; yet, there are a great many others who will make a much better success in life if they do remain in the country and take up farming as a profession. Many of these young men are now leaving the farms and going to our cities and towns, where they accept positions in stores and mills at low wages and with little prospect of ever bettering their condition to any great extent. These same young men could in many instances have made a splendid success at farming. It is not the work or life on a farm that many of them have objected to, but it has been the isolation of farm or country life. This can be remedied by the construction of good roads, and I am confident that any community or county in many of our southern states that is now being troubled by its young people leaving the country, can check this exodus very materially if they will arrange for the construction of a system of good roads. It will be one of the very best investments that the community can make, for it will not only help to solve the problem under consideration but it will also assist in solving the road problem that is now confronting so many of our farmers.

Our farmers are also closely identified with our forest areas and we will find that there is a decided relation between good roads and the conservation of these forests. As has been stated by Mr. J. S. Holmes, Forester of the North Carolina Geological and Economic Survey, * "a forest cannot be managed to the best ad-



Street Scene and Childrens' "One Acre" Neighborhood Playground at Brownwood, Texas. This Playground Was Donated to the City by Mrs. Beltis Taber and is Kept Up at the City's Expense

or territory, but there is a decided and steady increase in all of them. This large growth in population means a constantly increasing call upon all our natural resources; and it is time that we, as a nation, give very serious consideration to their conservation, for we must realize that our responsibility does not rest with providing for the present generation, but we must also do our part toward providing for future generations by conserving and perpetuating for their use the natural resources that we ourselves now enjoy.

The conservation of our soils and forests stands out preeminently as the most vital duty demanded of us, and the carrying out of this to its fullest accomplishment falls principally upon the farmer. The farmer is called the most independent of men, and in many sections of the country he is; but in many others he is not, and instead we often find him a very discouraged citizen. If we expect our farmers to take an interest in the conservation of our soils and forests, we must assist them by providing adequate means of transportation for their products and prevent combinations from being formed whose object is to curtail the price received by the farmer for his products and increase the price to the consumer. Upon the farmer rests almost entirely the problem of the conservation of the

vantage unless the inferior species and lower grades
*Bull. 8. So. Appalachian Good Roads Association,
1910, p. 13.

of timber can be profitably marketed, and this is only possible where the cost of transportation is low enough to warrant it. The difference between \$1.00 and \$2.00 per ton for hauling, or the difference between a bad and a good road, will often determine the possibility of profit or loss of marketing timber."

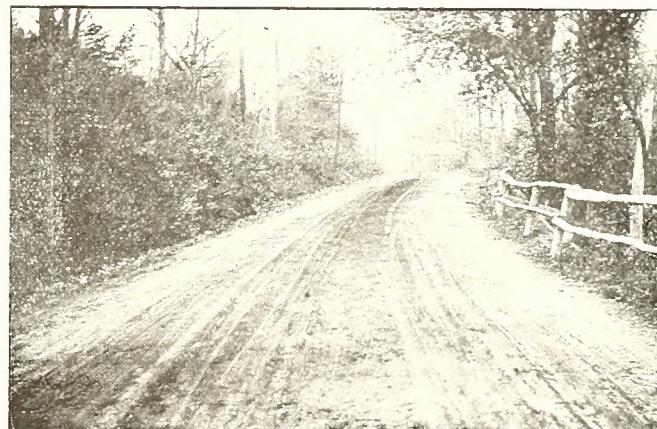
In many of the counties of the Southern Appalachian region the cost of hauling the timber to market is greater than what the owner receives for the timber on the stump. As an illustration of the amount of money that is being expended for the transportation of lumber over our public roads I will give some figures regarding the sixteen counties in North Carolina that are west of the Blue Ridge. In this region three quarters of the area is now in forest, and, probably, the larger portion of this area is better adapted for the production of forest than for any other purpose. During the year 1909 it was estimated by the state forester that fifteen million cubic feet of timber were hauled to market or to the railroad by wagon over the public roads of these counties. The estimated cost of hauling this timber was \$750,000.00, and in this particular instance it amounts to twice as much as the timber itself was worth on the stump. With this excessive cost of hauling, it can readily be seen that only the most desirable types of timber can be hauled and that the lower grades and the inferior species must be left in the woods. With these conditions, it is only natural that the lumbermen should skin the forest of every single desirable tree that he can afford to cut and haul to market, and thus many of the forest areas of the Southern Appalachian region have been almost entirely deprived of many of their most valuable trees, such as black walnut, cherry, yellow poplar and white oak. There is practically but little chance of decreasing the length of haul in transporting these forest products, but there is a splendid chance of increasing the load to be hauled by the construction of good roads.

Our farmers are partially at fault for the wholesale waste of our timber, but the states themselves are by far the most to blame for not providing good roads through these forest areas, which would have permitted the farmer to make a good income off of his farm and not be tempted to sell his timber for a mere song. Thus it will be seen that if the forests are to be protected and perpetuated, we must construct throughout the region a system of good roads. There is another way in which good roads throughout these forest areas will play an important part in the conservation of our timber resources, and that is, they will enable automobileists, coaching parties and tourists to travel through these forest areas, and they will recognize their importance to their respective states and it will then be much easier to pass the laws necessary to conserve these forests.

The reclamation of cut over and abandoned farm lands is much more readily accomplished when these areas are traversed by good roads. Although the farmer may not consider as a profitable investment the reforestation of his cut over lands or that portion of his land that he has abandoned for farming purposes, yet, he will take up the question of the reforestation of these areas if they are traversed by good roads, for he will realize that it will improve the general appearance of the country, making it look more profitable and so increase the value of his cultivated farm, as it will be surrounded by land that is growing forests instead of land that is being cut into gulleys and looks like worn out, abandoned farm land. With a system

of good roads it will be found that many of the farms that are not now being cultivated will be worked and again become prosperous, and thus aid to the material wealth of the state in which they are located. It has been said by the governor of New Hampshire, that since the construction of a system of good roads throughout that state during the past five years, nearly all of the abandoned farms in New Hampshire or at least the majority of them are now again in a state of cultivation. If this can be made true in one state, it can be made just as true in another.

From the commercial standpoint the question of the construction of good roads comes closer home to the farmer than to any other class of people, as practically all agricultural products have to be hauled for at least some distance over the public roads, and such a system of roads will do more to conserve the time, labor and wealth of the farmer than any other one thing. As we know, there is but little chance of reducing the railroad transportation charge on these products, but there is a splendid opportunity in nearly every county of every state in the south to reduce the public road transportation charge. Over many of the public roads



Oiled Macadam Road, Jefferies, N. H. Perfectly Dustless. Automobiles Travel at Rate of Fifty Miles an Hour

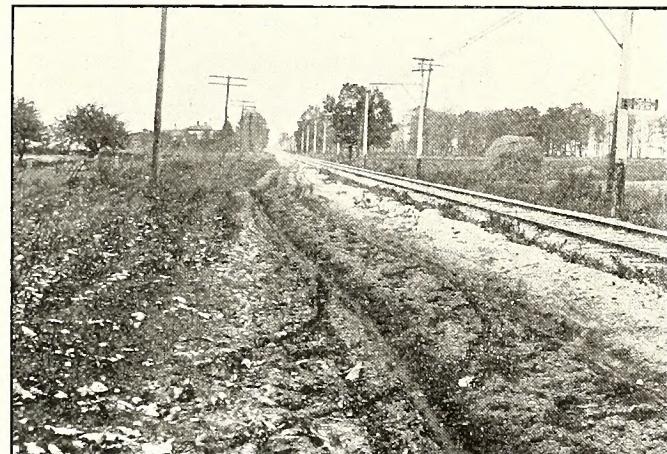
of the south it is now impossible to haul a load of more than half a ton. It may be that a considerable portion of the road over which the load is to be hauled is a fairly good one over which one or two tons could easily be hauled, but, on account of the many heavy places and grades on this road, it is impossible to haul over the whole distance more than the half ton, as it is necessary to load the wagon for the rough, heavy places and not for the good portion of the road.

There are many ways in which the farmer will be benefitted by a system of good roads besides improving his social condition, and it may be advisable to enumerate these here, as they have a direct bearing on the improvement in country life, which, in the end, has a direct bearing on conservation, especially in its relation to soils and also in conserving the time, labor and health of the farmer. A system of good roads connecting farm with market will often permit the farmer to raise certain crops that are more valuable than others, more easily handled, and which will bring a much greater income than he could possibly raise and market when he is on a bad road. I could give numerous cases to illustrate this point, but it is sufficient to state here that it will be found that good roads are a factor in making a farmer realize the necessity of getting the most out of his soil, realize the necessity of studying his soils and the value of rotation of crops.

Another beneficial result that the farmer derives

from good roads is that he is able to economize time and force in the transportation of produce between country and market. The distance that the farmer lives from market is not a question of miles, but of the roads that he must travel to reach the market, and of how many hours and how many horses it requires to haul a load to market. When thus measured, ten miles of good, smooth highway is not as long as a few miles of mud and stone. Our farmers are realizing more and more that the distance they live from market is measured in time and not in miles.

Another advantage that improved roads will give to a farmer is that it will permit him to take advantage of market fluctuations in buying and selling, and to take advantage of any special demand that may arise for any of his products. It will permit him to do his hauling at any time of the year regardless of the weather, and thus when it is too wet to work his crop he can haul to and fro from town. At the present time in many sections of the country the farmer can only haul to advantage in dry weather, and frequently the dry weather comes just at the time he is most needed to work his crop; so that he either loses the opportunity of a demand that has arisen for certain of his products at a good price or has to neglect his crop. In many



Bad Road Between Racine and Kenosha. On the Right is the Chicago and Milwaukee Electric Railway

sections the construction of a system of good roads has made it possible for farmers living eight or ten miles from large communities to raise garden truck where formerly this could only be produced advantageously within a few miles of a city. The railroads are also greatly affected by the conditions of the public roads in regard to the transportation of farm products, for the reason that on account of bad roads many of our farmers are only able to raise certain crops and are only able to haul them at certain times of the year, which means congestion of freight at the railroads during certain seasons and from 50 to 75 per cent less during the rest of the year. I believe that these conditions in many sections of the country have a decided effect upon the freight rates that the railroads can give for hauling farm produce. Congested freight, which makes it necessary for the railroads to go to extra expense to produce cars and then with practically no freight at other times, when perhaps their cars are going by these stations empty, causes the extra high freight rate.

A third beneficial result that a farmer derives from good roads, and one regarding which most of our farmers have paid little, or no attention, is the saving in the wear and tear on horses, harness, and vehicles,

when these are used over good roads as compared with their cost over poor roads. Then, again, little thought is given to how many days in the year we have to leave our horses and miles standing in the stables on account of bad roads. There is an enormous sum lost each year in this way by nearly every southern state that can be charged up directly to bad roads. This amount is due to the wear and tear on harness and wagon and the loss of time of those whose living is dependent upon driving and teaming and the loss that a liveryman and farmer sustains when he is unable to work his animals on account of bad roads. This amount in many of the southern states is from twelve to fifteen million dollars a year, all of which could be readily saved to the states by the construction of good roads.

It will be impossible to carry out the principles of conservation in their entirety until the people are more fully educated as to the need of conservation, and there is no better place to begin this educational work than in our public schools. Nature studies are already beginning to take a strong hold in many of the schools of some of the states and it will not be long before the general subject of our natural resources will be taken up in nearly all our public schools. The best results, however, along this line can only be accomplished in the better graded schools, and we will find that such schools are dependent upon good roads. Although the one room schoolhouse that dotted this country in its early history, has done a great deal of good in its day, yet, we will realize that a six room school house, with six teachers, can do better work than six school houses of one room each, where the same teacher is obliged to teach scholars of all ages and attainments. The development of the graded school is dependent upon the construction of good roads, and, although we may not realize it, every mile of good road that we build we are increasing thereby the educational facilities of our children.

In closing, I wish to emphasize one point, and that is that while the construction of good roads is one phase of conservation, the maintenance of the road after it is once constructed is a still more important phase of conservation, and one regarding which we are often apt to give but little consideration. Any county or state arranging to construct good roads should always, at the same time, provide the revenue for the maintenance of the roads after they have once been constructed.

The Good Roads Machinery Company, of Kennett Square, Pa., has issued one of the handsomest catalogues of the season, showing its complete line of Champion Crushing and Road Building Machinery for 1911. The catalogue explains in a perfectly plain and understandable way their admirable line of machinery and persons interested in road building should have the catalogue.

The Canton Culvert Company, of Canton, Ohio, manufacturers of corrugated metal culverts, shiue pipe, bridge arches, etc., is ready to send out its annual culvert booklet for 1911. The booklet shows photographs illustrating tests and installations under various conditions, proper weights for standard diameter corrugated culverts. Illustrations of proper gauge thicknesses, tables, etc., and it is a piece of literature that no road builder can afford to be without.

Upson county, Ga., holds an election this month on a \$100,000 bond issue for roads.

Aransas Pass., Texas, has voted bonds for \$20,000 for street improvement.

Wichita Falls, Tex., has voted an additional \$25,000 for street work.

Relation of Good Roads to Economic Forestry

By MR. J. S. HOLMES, Forester, North Carolina Geological and Economic Survey

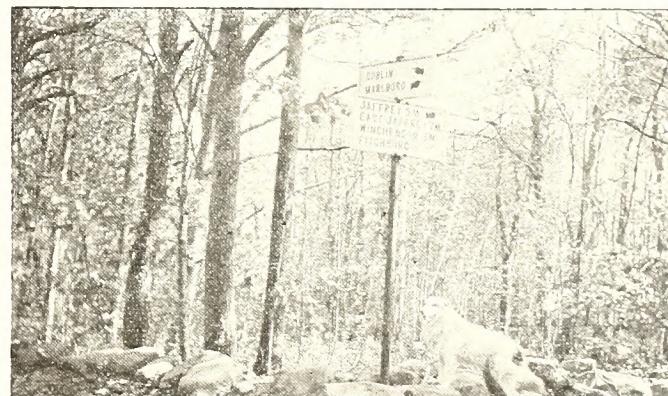
The improvement of our highways and the protection and perpetuation of our forests are two of the most important problems before the people of the South today; yet it is not generally recognized what a close relation and inter-dependence these two have to one another. A forest cannot be managed to the best advantage unless the inferior species and lower grades of timber can be profitably marketed, and this is only possible where the cost of transportation is low enough to warrant it. The difference between one dollar and two dollars per ton, or the difference between a bad and a good road will often determine the possibility of profit or loss in marketing timber. Accessibility to market is one of the first things a purchaser looks for in buying timber, and the quality of the road over which the timber must be transported to market determines this accessibility.

An instance of this came to my notice last summer. A lumber firm, which had been doing a large business for several years in buying lumber and hauling it often quite long distances to the railroad station, was closing out this business. The chief reason was that the roads in this county were too bad to make such a business profitable. This same county had materially changed its road law at each session of the legislature for the past ten years, so that the people, protesting against each law in turn, had absolutely neglected the roads, which were, in consequence, in a pitiable condition.

In order to justify the cost of construction and maintenance of good roads, a sufficient amount of traffic over them must be assured. The forests in the Southern Appalachian region furnish, and always will furnish, a large part of this traffic. The average farmer is not going to vote bonds, which he and his children will have to pay, for the purpose of building a road to benefit the automobile owner who perhaps lives in the next county or the next state, and who does not pay a cent toward making or keeping up these roads; he does not readily realize the indirect profit accruing from the increased tourist travel. The farmer wants to see that the road will pay him personally and this he can do in the reduced cost of marketing his agricultural and forest crops. One noteworthy feature in this connection is the fact that practically all the advantage of good roads accrues to the land and timber owner and not to the operator. The cost of transportation is reduced by one dollar through good roads; the value of the stumpage, i. e. the standing timber, is increased that much. For example, a tract of timber in Caldwell county within a mile of Lenoir recently sold for \$8 per M. stumpage, while similar timber is only bringing \$5 per M. at a distance of ten miles from the market over indifferent roads. The difference in cost of hauling is about \$2.50, all of which is added to the value of the stumpage.

There is no doubt that the amount paid out for the transportation of forest products over the roads of the western part of North Carolina exceed that for hauling all of the agricultural, mineral, and other productions combined. Take Mitchell county (N. C.) for an example. Last year it cost the people of this county approximately \$130,000 for just the hauling of their forest products to the railroad. With good roads there is no doubt that this cost might have been cut in half. This same county has a forest area of upwards of 175,000 acres. If this area were protected

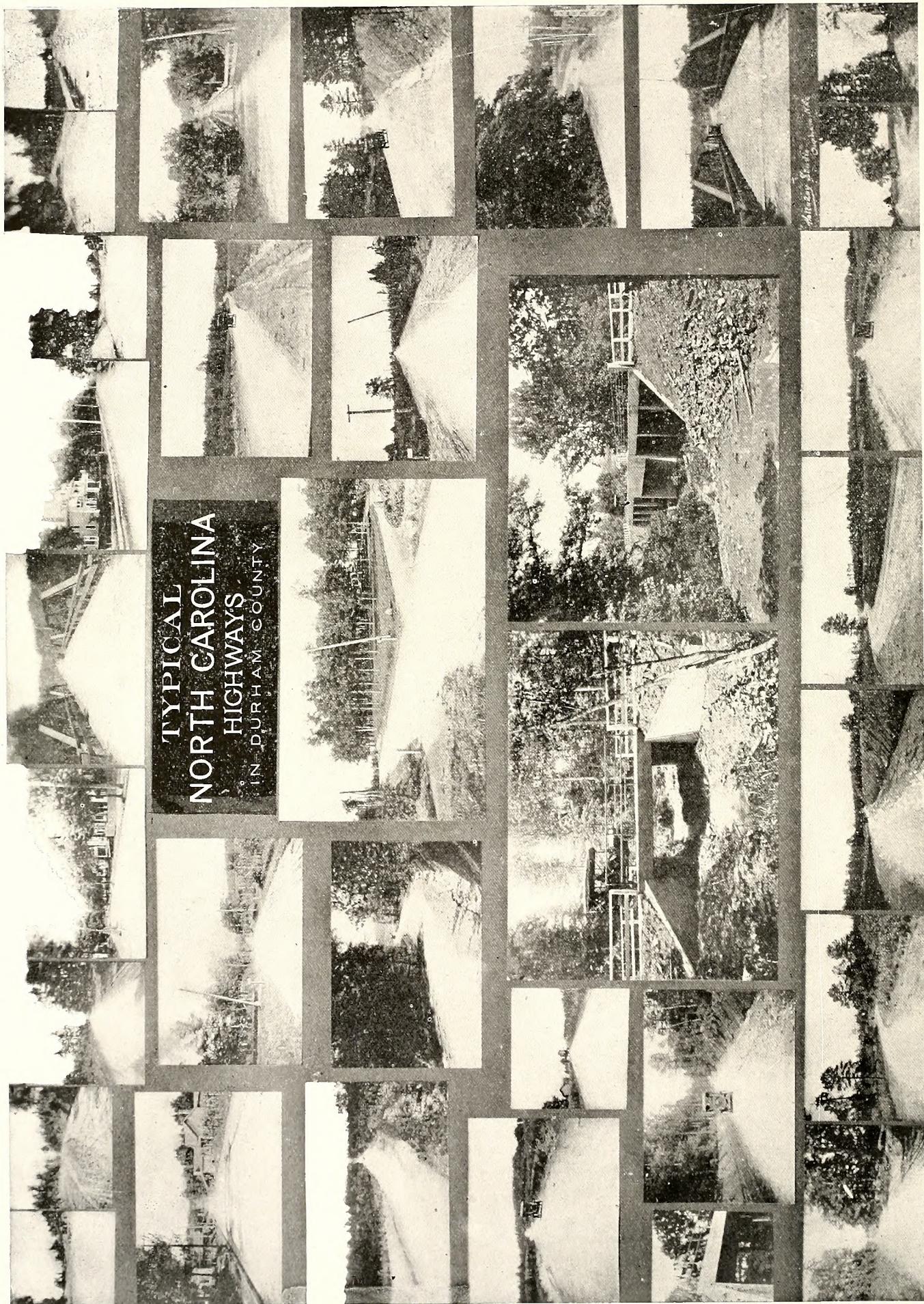
from fire and lumbered conservatively, the present large output could be maintained indefinitely, so that an annual saving of \$65,000 to the people of this county on the hauling of their timber could be secured as long as the good roads should last. Taking the region as a whole, in the sixteen counties of North Carolina west of the Blue Ridge, three-quarters of the area is now in forest, and probably even a larger proportion of forests than for any other purpose. It is estimated that in 1909, 26,000,000 cubic feet of timber was marketed in its various forms in these counties. The greater part of this was sold as lumber, cord-wood for pulp and tannic extract, and tan-bark. Of this amount about 11,000,000 cubic feet was transported by flume or by rail direct; the balance, or about 15,000,000 cubic feet, was hauled to market or to the railroad by wagon over all sorts and conditions of roads. The estimated cost of transporting this material over these roads was half a cent per cubic foot



Auto's Delight. Road Signs. Near Dublin, N. H. New Hampshire Laws Compel Signs Like These at Every Intersecting Road

per mile, or from 4½ to 5 cents per cubic foot for the total haul, amounting to some \$750,000. This large bill of costs for simply the road haul, amounting to twice as much as the timber itself is worth on the stump, takes all the profit out of handling these forest products that have to be transported by wagon. The vast majority of the men who handle timber from the stump to the railroad make little more than wages, and often very poor wages at that. Besides this, it is usually only the most desirable timber that can be handled; the lower grades and the poorer species must be left in the woods because of the prohibitive cost of the haul. It is thus seen that the conservation of our timber resources is dependent to a large extent on good roads.

Take for example, the one item of cord-wood. Cord-wood is essentially a low grade forest product, which in the greater part of the mountain country is now not marketable, so that much is going to waste. The removal of this material in practically all cases improves the forest condition, yet it cannot be marketed profitably without good roads. Cord-wood in Gaston county which has fine macadam roads is being hauled 12-14 miles to market; in Buncombe county, though in the mountains, cord-wood can be hauled profitably 6-10 miles over its improved roads; while at the same price this material can only be brought to market a



distance of $\frac{3}{4}$ mile in surrounding mountain counties where the roads are unimproved.

The cost of transportation must in most cases be reduced by increasing the size of the load. This increase in the size of the load can be brought about in two ways: by reducing the grades, and by improving the surface.

Steep hills necessitate a reduction in the size of the load and so increase the cost of hauling. A horse that can pull 1,000 pounds on the level, can double his exertion on short pulls and take the same load up a short hill of as much as 4 1-3 per cent grade, but he could not take the same load up a 5 per cent grade, nor up a long hill of even 1 or 2 per cent grade. The following table* gives approximately the increase in cost of hauling up different grades:

Increase in Cost of Hauling a Load Over Roads of Different Grades. Increased Cost.

1 per cent grade, or 1 ft. in 100.....	11 per cent
2 per cent grade, or 1 ft. in 50.....	23 per cent
4 1-3 per cent grade, or 1 ft. in 24.....	100 per cent
5 per cent grade, or 1 ft. in 20.....	150 per cent
10 per cent grade, or 1 ft. in 10.....	400 per cent

*Deduced from Table p. 6, Farmers Bul. 136, U. S. Dept. of Agriculture.

From this table we gather that if we can reduce a 10 per cent grade—and there are many such in the mountains—by changing the road to 4 1-3 per cent grade we reduce the cost of hauling one-fourth.

The improvement of the surface, however, is just as important as the improvement of the grade. The approximate cost of hauling one ton over a level road with different surfaces is given by Dr. Joseph Hyde Pratt* as follows:

	Cts.
On broken stone road (macadam) dry, and good order.....	8
On sand-clay road, dry and in good order.....	8
On compacted gravel road.....	13
On earth road, dry and hard.....	18
On earth road with ruts and mud.....	39

*"Good Roads Movement in the South" in Annals of the American Academy of Political and Social Sciences, Vol. XXXV, No. 1.

It can be seen by this that the cost can be reduced from one-half to one-fourth simply by improving the surface. The present road can be drained, made smooth, and compacted, or, if we want to save still more money in our hauling, a surface of gravel, or macadam can be put on at a cost varying up to \$4,000 per mile.

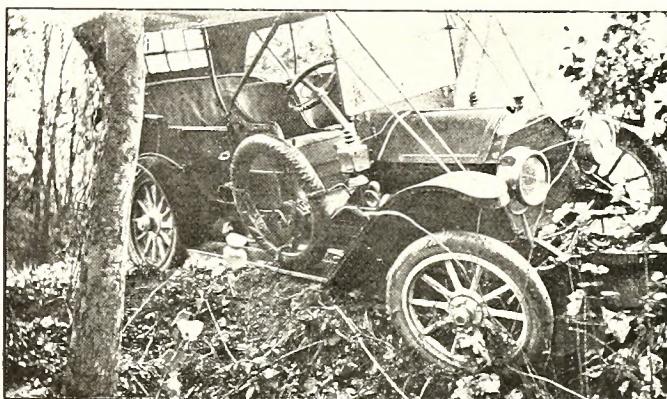
If, by improving along either one of these lines, a reduction in very many cases of one-half to one-fourth can be secured, it is not hard to realize that by improving the average mountain road along both these lines, an average saving for practically all of these mountain roads, of at least one-half, can be made in the hauling bill. This saving of one-half the hauling, in the forest products alone, would amount in these western counties to about \$375,000 a year. If this amount were put into road improvements, it would allow an expenditure of over \$60 a mile for every mile of public road in the region. Looking at it in another way, this amount would be enough to pay the interest on over \$6,000,000 worth of bonds, which amount should macadamize at least 100 miles of road in every county in the region, or should surface with sand-clay or gravel every mile of public road in the mountains.

All road work whether of improvement or maintenance should be in the hands of the county as the most effective unit of effort. Some counties have seriously handicapped the effectiveness of their efforts in road improvement by turning this work over to the town-

ships. This has, as a rule, engendered petty jealousies and has prevented the development of any system of good roads. A township usually cannot, or will not, afford to pay a good engineer, and has either to hire improved machinery from the county or another township, or else is handicapped by spending too large a proportion of its money for these purposes. A township voting bonds, only wants the road where it will benefit the largest number of residents of the township, without any reference to the rest of the county; not only this, but sometimes it purposely neglects to put a piece of road where it should go because it would be used chiefly by residents of another township.

There are three principal ways in which the improvement of the county roads may be brought about, all three of them originating with and working through the county.

(1) The improvement may be gradual and slow, brought about in the course of general maintenance under the present system. Even where the old system



Clay Road Sylacauga, Ala., Showing That Red Clay Becomes Slippery After a Rain. Note the Wheel Guard on the Bridge is All That Holds the Automobile

prevails, where the hands work four, or six, or eight days in the year on the county roads, much can be done to improve the surface if there is a competent overseer in charge and the men are anxious to improve the road and put in honest time. Water may be drained off the road, mud-holes filled up, rocks and other inequalities removed, so that the cost of hauling may be materially reduced.

(2) We are now, however, beginning to see that we need more rapid and more permanent improvements in our roads, so that a second and more advanced step is advisable; namely, the organization of the county prisoners into a chain-gang. This gang, under the direction of a man who understands road-making, can accomplish much permanent improvement on the roads by blasting out rocks, cutting off the tops of hills, building culverts, drains, etc., at very slight additional cost to the county. Such a gang has done lasting good in several of the mountain counties, and no county can afford to keep its prisoners in idleness when so much can be accomplished by them.

(3) But even this method is too slow for our progressive age. If we can save \$25,000 a year per county on hauling our forest products alone by the improvement of our roads, the sooner we get good roads all over the county the better. As an improved road reduces the cost of everything hauled over it for all time to come, and the first outlay is the greatest cost, so it seems only fair that all people benefitted by the road now or in the future should help to pay for it. The issuance of county bonds seems, therefore, the fairest and most sensible way to raise money for permanent improvement to roads.

State Must Take Action in Good Roads

By MR. D. A. TOMPKINS

When the thirteen American colonies had gained independence it was at once appreciated that the beneficial result was due to certain federated powers. When the United States were organized as a federated nation under a constitution, that constitution particularly empowered the new federal government to build highways or post roads. As far as I know the general government has never built a highway or post road for vehicles. Pacific and other railways have been helped, but the constitutional powers of the federal government have been dead as far as ordinary good roads are concerned.

Therefore it seems probable that each state will have to build its own highways or turnpikes. Therefore why should North Carolina not settle upon some one road and then break ground to build it. Nothing would do more good at present than for the state to build a stretch of 200 to 300 miles of graded road—macadam where necessary, but some cheaper roadbed where suitable material can be found. It seems prob-

lines or interstate roads. It extends to every byway on which the mail is carried, whether interstate or intrastate. The constitution as fully authorizes the general government to build a road from Charlotte to Wilmington wholly inside the state of North Carolina as from Charlotte to Rock Hill in two states.

At several times there has been serious agitation about appropriations to build national highways radiating out of Washington to and through the central west, to and through the middle states and to and through the south. At first the government was too poor to undertake such work. Then canals came. These were built, sometimes by states and then by corporations. Then came the railways. These were built also by states and by corporations. The Pennsylvania railroad and the North Carolina railroad are examples of how the states spent their money on railroads with the idea that such aid would do more good than state highways. Besides the influence of this opinion the states had ceded, in the constitution, the power to the general government to build post roads and in all respects to monopolize and control the postal service and the post roads.

After the canals and the railroads came, the federal government still neglected its road-building powers. Better mail service might have been an incentive in some states for the state to improve the common roads. But all control of the mails was gone from the states to the same power that might best have improved the highways.

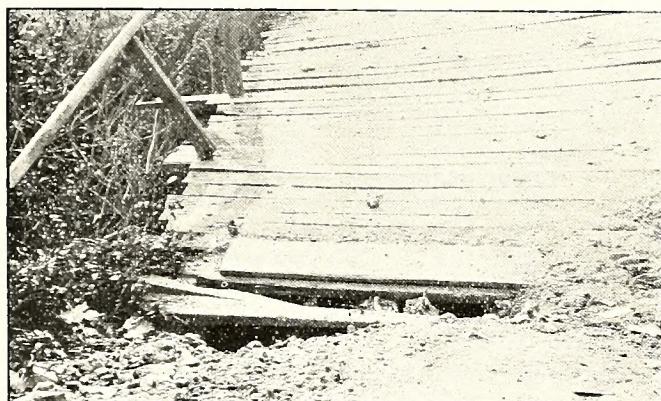
The general government has shamefully neglected its highway and turnpike powers. It has helped canals, railways, river improvements, often extravagantly, often wastefully. It has erected expensive buildings for postoffices to improve the postal service, etc., but never a penny for the most important factor in the postal service—neighborhood post roads.

In this unfortunate situation the states, counties and townships might as well get busy and not wait longer on congress. Congress has neglected the matter so long that it hardly recognizes the construction and maintenance of post roads as a constitutional duty of congress.

The state of North Carolina might well let its experts agree upon some through highway, perhaps from the mountains to the sea, perhaps from the Virginia to the South Carolina line, and make a model highway, model as to excellency and model as to cheapness. The state might pay one-half the cost and the remainder might be assessed upon the counties and townships through which it passes.

It is notable wherever good roads have been built that farming has improved far more than the value of the money paid for the roads. All property improves along the new highways and therefore the tax assessment necessary could be well borne.

The general government might well take something off the public buildings appropriation and the river and harbor appropriation and distribute the amount so taken to the different states, to at least encourage them to build the highways which the general government has neglected to build. Perhaps if North Carolina will determine upon a particular through highway the general government might contribute to its construction. It seems to have ample constitutional power to do so. Any way we have had general boom



Bridge Near City Hall, Florence, Alabama. This Bridge is Within Two Minutes Walk of the City Hall and Courthouse

able that we have stuck to the macadam idea and constantly improved the macadam structure until the latest forms of these threaten to become too expensive for general adoption. There are many gravels that would do in many localities in place of macadam. In many other places a fairly hard clay road only needs a top dressing of sand and proper drainage, or where there is a sand road, then, a little admixture of clay makes it all right or an important improvement.

If the state should undertake a stretch of, say, 250 miles it might give special attention to using local materials all along the line. Opening up the road to sunlight and winds would help immensely. This means cutting away overhanging underbrush where the forests come up to the roads. This underbrush does no good as shade for those using the road but it only shades the mud from the sun and the winds.

The truth is that the states have so long depended upon the federal government to build some main lines for horse and vehicle roads that they have lost track of what the states may themselves do. The undoubted purpose of the federal constitution makers was that the general government should build main trunk lines of post roads. The government is fully empowered to do this and the power is in no way limited to main

talk and writing enough about good roads in the state to justify some one specific effort to get a state road. The counties, townships and cities have done very well and the movement has good root in many of these, but there is need now of some state and interstate thorough-

fares with the help of the state and the nation and it seems time now for Mr. Pratt, the state geologist, and Mr. Spoon, the state road engineer, to define one of these so everybody may work for it and bring it into material existence.

To What Extent Do Automobiles Destroy Our Roads

By HON. LOGAN WALLER PAGE, Director United States Office Public Roads

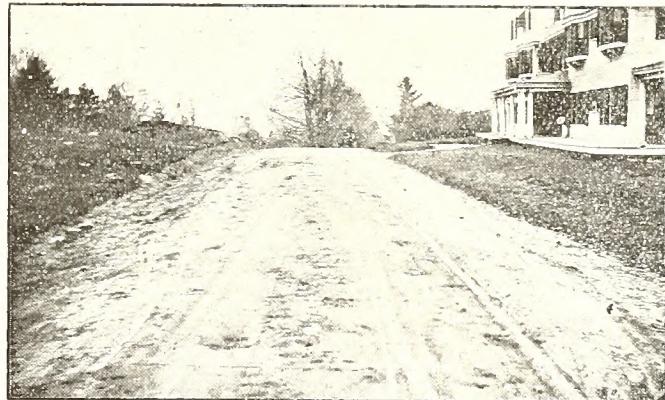
This question and its immediate sequel, "What shall we do to prevent this destruction" are the summing up of the most serious problem with which road builders have now to wrestle, and with all the discussions as to "cause" and "remedy" which have taken place during recent years, we can not yet feel that we are any more than fairly started on the way to a solution of the problems.

In considering the injurious effect of motor traffic on our roads, I shall confine myself to a consideration of what has always been considered our highest type of construction—the broken stone road—as first specified by the eminent French engineer, Tresaguet, in 1775, and later improved upon by Telford and MacAdam. The principles involved in their methods of road building really depended upon the wear of traffic for the preservation of their roads. They had to contend only with horse drawn vehicles, and the dust which was constantly being worn from the stone, acted as a filler in the road surface, and under the action of moisture formed a cementing medium between the stones. Therefore, in a well constructed macadam road, where the selection of stone was suited to the volume and character of traffic, the fine dust resulting from wear was just sufficient to replace that carried away by wind and water; the action of water caused this remaining dust to recement and the surface was thus automatically rebonded. Moreover, the road surface remained practically impervious to water and the foundation was protected.

The advent of the automobile has, however, completely changed conditions, and the seriousness of the problem becomes more impressive when we consider the rapid advance in the production of motor propelled vehicles. It was estimated that on November 1, 1908, there were in the United States about 150,000 automobiles. The output in 1908 was 55,000 cars, for 1909, about 80,000, and it is anticipated that the close of the current year will have seen a year's production approaching the 200,000 mark. And whereas the early output went largely to the large centers of wealth and were looked upon as a rich man's latest luxury, we now find the automobile in common use throughout the length and breadth of our country—not a luxury, but a necessary means of daily travel for the business man and the farmer, who is the better enabled to cover his often widely distributed property. It has, therefore, come about that the smallest community is face to face with the problem of meeting the new conditions brought about by these changes in the character of the traffic passing over their local highways.

There has been much discussion from time to time as to the reasons for the destructive action of automo-

bile traffic, but I think the series of experiments conducted by the Office of Public Roads has given some most interesting and conclusive results, which although previously published, will bear repetition in the present instance. A sixty horse power car stripped for racing and weighing with driver and mechanician about 2,800 pounds was driven over a stretch of level, broken stone road, first at five miles an hour, with increasing rates of five miles an hour until a speed of sixty miles was attained. The road was a section of government road which had been re-surfaced two years previous to the test and was in good condition. Photographers were stationed at a point on the road designated for the proper speeds and photographs were taken of the



Earth Road, Jeffray, N. H., Showing What Can Be Done With an Earth Road Where the Use of Wide Tires is Encouraged

effect produced during the passage of the car. It was evident from a consideration of these photographs that up to fifteen miles an hour little or no effect was produced on the road and even at twenty miles an hour the observers concluded that no serious damage was done. From twenty miles an hour on, however, the effect was decidedly noticeable with each increase of speed, and the dust is often lifted from the road by the severe shearing stress of the driving wheels, which I have compared to the action of a circular saw going through a board. Once lifted from the road, this fine material is subjected to the effect of air currents generated by the car body and subsequently by the wind. Thus, large quantities of the very material that is essential for bonding the road together are rapidly carried away, the wearing stones are soon left bare and loose, and subject to displacement, water finds its way into the body of the road and a general deterioration rapidly sets in. It is therefore evident that the most serious damage to our roads as a result of increased motor traffic is due to the shearing stress of the rear wheels on the road surface when the machine exceeds a speed of twenty miles an hour.

There is another source of injury, which is not so serious for the reason that it is confined to rather sharp curves and easily overcome. This is the tangential stress or tendency of the car to skid in rapidly rounding a curve, thus shifting the crown of the road tangentially to the gutter. This difficulty may be obviated by raising the outer side of the road.

But while the automobile is continually lifting the valuable binding material from our roads, and causing injury to crops, property values, and even the health of neighboring communities, it is doing absolutely nothing toward replacing the dust so distributed. The principles of MacAdam and his predecessors are set at naught, for whereas the iron-tired horse-drawn vehicles of other days caused a continual replenishing of dust, the motor driven car with its pneumatic tire is practically without any wearing effect on the road stone. As motor traffic increases, a point is reached where the type of road has to be changed, and this point varies with the volume of horse traffic and the volume and speed of motor traffic—a condition in part brought about by a failure of the motor vehicle to produce sufficient wear on the road surface.

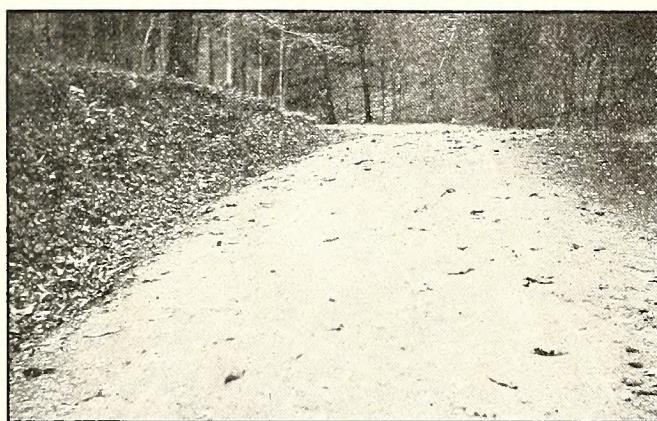
It is those who have the building and maintenance of our rural highways who are most seriously effected

cessful, although even this very hygroscopic salt has a tendency to dry out unless the climate is quite humid. The lighter residual oils and tars have been used in holding down the dust with varying success dependent on the quality of the material, its method of application, and adaptability to the character of the road in question. And right here it may be said, that while I do not think a fully satisfactory solution of our great problem has been reached, it is an unquestionable fact that a large percentage of the failures to date has been due to the application of inferior materials deficient in certain well known necessary characteristics or to the use of good products in conditions to which they are not adapted. There has been a too general acceptance of the fact that any oil or tar is a good dust preventive or road building material, and that whatever the eager salesman guarantees (?) must be good and fulfill all the claims he makes for it.

While results from surface treatment can only be regarded as temporary, lasting, perhaps, in the case of proper oils or tars, throughout a season, more permanent results have been secured through the application of some of the heavier bitumens during construction. These may be applied either by heating and mixing with the upper course of stone before spreading, known as the mixing method, or, pouring the hot bitumen into the upper course of stone after it has been shaped, known as the penetration or groating method. The former is the better way, in that a more uniform distribution of the binder is secured, but the method involves considerable expense, as well as time, especially where a proper plant is not available and the mixing has to be done by hand.

By working along those lines we have certainly bettered conditions and produced a highway better fitted to resist the ravages of modern traffic, but there is much work ahead of us before we can say that we have wholly solved our problem. Automobile production is increasing with rapid strides, the distribution of cars is becoming daily more general, and whereas almost the entire output of cars has until now been largely for passenger transportation, I believe the next ten years will witness a great development in freight transportation. In England large quantities of food are transported to the city of London in trains of cars drawn by traction engines, and these trains return to the farms with supplies. The value and economy of motor transportation for freight in cities has been demonstrated and the economy of building roads over which it can travel in the country will become more and more evident to the tax payers in rural districts. And while there is a tendency on the part of many to severely arraign the automobile for its destructive action on our public highways, they should not lose sight of the other phase of the subject which is worthy of serious thought. The application of mechanical arts to our daily convenience and comfort necessarily introduces new problems which require long and patient experimenting for their solution, but when solved, are apt to produce a betterment of conditions that might otherwise not have been reached.

So the motor vehicle, while tending to destroy our broken stone roads, has had an improving influence, not only in the building of many miles of better highways, but in rendering most urgent the study of road improvement and preservation. The dust nuisance antedated the automobile by many years: if our experimental work leads to success, it will demonstrate the really beneficial effect to ourselves and posterity that motor traffic has had upon the development of the art of road building.



Chert Road, Florence, Ala. United States Object Lesson Road. Built in 1900
Now 11 years Old and Not a Cent Spent on it Since Constructed
Value of Competent Engineering Illustrated

by this great problem. It is comparatively easy to control the speed of motor traffic, through our larger towns and over the park systems of our cities and it is admitted that at low rates of speed the motor vehicle is no more injurious to the road than ordinary traffic. But, in the open country, where we have the grinding action of the iron tire and heavy load followed by the high-speed automobile throwing up and distributing the products of wear, we are confronted with the necessity of providing a new and more durable form of road.

For several years past, highway engineers and chemists have been uniting their efforts in attempts to solve this problem, and, generally speaking, have experimented along two lines, either to add some palliative to the surface of the road in order to hold the dust or else to construct the road with the use of some binding material that will hold the stone in place. Water was the original dust layer but its continued application is costly, especially on long stretches of open highway where facilities are not always at hand for securing water. The addition of hygroscopic salts to the sprinkling water was then tried with the object of having the salt retain the water in the road surface, and in this respect calcium chloride has proven fairly suc-

The Good of Good Roads

By MR. E. W. JAMES, United States Highway Engineer

The good roads question is one of the oldest of the public propositions that have interested and worried mankind. Men have been concerned about their roads from the time history began to be written. To the question of good roads, as in the case of most questions of such long historical standing, history itself has provided the answer. We are no longer in any doubt on any point of the question: Are good roads good for us? The history of the public works of every modern nation, indeed of every civilized nation for a thousand years and more, declares that good roads are valuable, good roads are profitable, and in the long run good roads are indispensable features of the public economy.

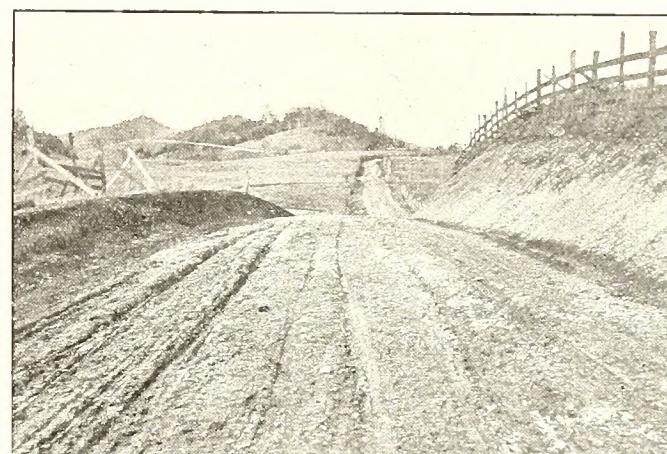
Now, we are not particularly interested in the good roads of other countries except as they may point our consideration of the matter in the right direction. We are vitally concerned, however, with good roads in our own country, in our own counties, and in our own home towns. It is safe to say that the United States has the longest mileage of poor roads and the shortest mileage of good roads, on a basis of population, of any western nation. But we are not to be blamed especially for this. As a nation we have been building roads for less than one hundred and thirty years, while England, for instance, has been building roads over nine hundred years. Furthermore, it has taken us only about one hundred and twenty-five years to get our infant national eyes open to the real value, to the true importance of good roads, while it took England and France about eight hundred years to get their national eyes open.

To-day, throughout the south, we are awakened and are daily becoming more alert to the increased wealth that free and open lines of communication mean to the agriculturalist, to the farmers in our land. Under the complex conditions of our modern life and the resulting fluctuations in the price of our staple products, the truth has been impressed upon the farmer that to realize the full intrinsic value of his money crops at any given time, he must be prepared to place them promptly and in large quantities at his selling points on short notice. If good roads between the farms and the towns will enable him to double the hauling capacity of his draught animals, he is prepared to take two-fold advantage of a good price. For instance, let me cite the case of Marion county, S. C., which is typical.

In that county they haul about three bales of cotton to a pair of mules (Aug. 1910). Now, it was not long ago stated in a speech in congress, and I have personally been told the same thing by many farmers of Marion county, that not infrequently the main street of Marion can be seen lined along both sides with wagons loaded with cotton to be sold. Not a bid can be got from a buyer until he has received his morning advices from the northern market. On those mornings when the advice comes that cotton is to be bought at a price to tickle the good farmer's ears, how he wishes he had six bales of cotton on his wagon instead of three! Now, he can put six bales on his wagon just so soon as he has good roads. This has been demonstrated in a dozen counties in the Carolinas. Realizing this, Marion county has through special act of the state legislature, prepared to bond herself for one hundred thousand dol-

lars, and under a special Board of Road Commissioners, spend this money on good roads. So it will not be long before many of the cotton growers of Marion can go to town in the morning, await the buyers' advices, and if the price pleases him, he can phone to his farm and have his wagons, already loaded maybe, come to the county seat or other town loaded with six bales each. The Marion county farmer will be able to take just twice the advantage of the moment that a farmer can take who lives in a county of unimproved roads.

The prompt marketing, not only of cotton, but of many crops, is most important. In Currituck county, North Carolina, where early sweet potatoes are famous and are making actual fortunes for their growers, the transportation is chiefly by water. There are numerous lines of steamers that ply the waters of Curri-



Blackford Road, Russell County, Va. This a Sample of a Badly Constructed Macadam Road

tuck sound and the Pasquotank river and these are relied upon to place the crop into Norfolk. When the early sweets come these boats drop their regular schedules, often on telephonic advice from the farmers, and without previous notice to the public, and begin transporting potatoes, picking them up at the farmers' docks and rushing them to Norfolk through the Currituck or Dismal Swamp Canal. For it is the earliest potato that commands the highest price and the price steadily declines.

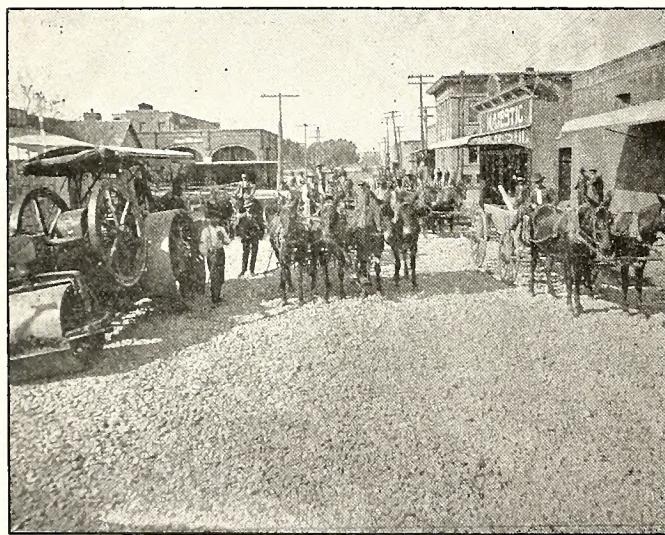
Now, the truck farmers of Florida or elsewhere, who have no water-front farm, must haul to the railroad, and it is seen at once how important it is that he be able to haul his truck promptly and in large quantities. His crop is perishable, and time is an important element in determining the price his crop will bring.

The cost of this transportation to the farmer is important. It has been estimated that the total cost to the farmers of the United States of marketing the farm products of the country is about six hundred millions of dollars annually. Notice that this charge is a dead load carried by the farmer. It is not like a fertilizer bill. If you spend twelve hundred dollars a year on guano or cotton seed meal fertilizers, you expect to get it back in increased crops. But the farmer who hauls his tobacco or cotton, ten miles to a warehouse gets no more for it than the farmer who is five miles from town. The transportation expenses enter but slightly into the

price a farmer gets for his cotton or corn or tobacco. Sometimes a farmer can increase his profits by increasing his fertilizer bill; sometimes he will lose if he economizes on fertilizers. There is a relation between his fertilizer bill and the profit on his crop. But there is little traceable connection between the cost to the farmer of marketing his crop and what he gets for it. The only way to make money on your transportation is by cutting down your transportation charges. To haul more cheaply you must make your hauling easier, be able to haul heavier loads, be able to haul more rapidly.

The only way to reach these transportation expenses and reduce them is through the medium of improved roads. You can't feed your stock less; you can't drive your animals faster; you can't load your wagons heavier on your present poor roads. The only thing that remains is to improve the roads.

A farmer of Claud, Elmore county, Alabama, kept a record of his hauling to and from his market town, Wetumpka, for one year. He made one hundred and twenty trips and rated them at two dollars per trip, figuring on the market price for labor and team. By doubling his load he could therefore save one hundred and twenty dollars per year.



Building Crushed Stone Streets at Brownwood, Texas. This City Already Has 25 Miles of Crushed Stone Streets and is Completing 55 Miles of Graveled Roads Leading Out of Town

From the above it is seen at once, assuming the correctness of the figures, that if we can cut transportation charges in half for the farmer, three hundred million dollars annually will be reserved to the farmer. Now, the question that at once arises in the mind of every one is: Where is this \$300,000,000, going to show? What part do I get, you say.

It is certainly true that this \$300,000,000 is a charge against the farmers' lands and outfits. If he can save it, it certainly must show somewhere. Each farmer must come in for his share of it.

Now, there are those who argue like this: You will save two dollars a year on each set of harness, they say; five dollars a year on each wagon because the wear and tear will be less; ten dollars a year on the upkeep of each draught animal because you will work them less. But there are objections to this way of looking at the matter. In the first place you are going to increase the loads you haul if you have improved roads, and the pull on your traces is going to be the same. Although your wagons are going to be rocked

less by improved roads, you are on the other hand going to load them heavier, and the wear and tear will probably be about the same. If the pull on the traces is the same, your animals are working just as hard as they did before on the bad roads. But notice: all the time you are hauling heavier loads, and your profits on produce are therefore larger. In addition to this, there is a way in which the farmers' saving in transportation charges shows in the value of his farm. Here is a farmer who holds title to one hundred acres of land at ten dollars; value one thousand dollars. The farm is five miles from town on bad roads. Let the county put that five miles of road in first class condition. What is the result? Someone comes along and offers that farmer fifteen hundred dollars for his place.

Now, that farm is essentially the same. A crop of, say, beans may have improved some part of it a little, but the soil is practically the same. It is the same farm. But the value of the farm is five dollars an acre more, and the wealth of the owner has increased five hundred dollars in one year. That is his share of the saving due to that road improvement. This may really be more than that farmers' share for a single year, but real estate values are likely to jump in that way. This increased value will persist during a number of years, and at the end of five years, say, that farmer's place will have an established value, recognized by everyone, greater than it had five years before, and a certain adequate part of this increased value may be attributed directly to the five miles of improved roads.

It is, then, largely to the increased value of your holdings that you should look for the financial benefits of good roads. It is in that direction that the large tangible profits lie. A banker in Elmore county, Alabama, known to the writer, recently during a campaign for a bond issue for roads, asked a farmer to set a fair price on his place, and agreed to contract for the purchase of that place on the day after election for one thousand dollars more, if the bond issue for good roads passed.

There are ways not financial in which you can look for immediate benefits. For the presence of good roads does much to increase the educational advantages, uplift and extend the social life, and widen the religious opportunities possible in a rural community. Farmers are everywhere awake to the benefits of school privileges for their children, and they should see the connection between good roads and good schools. They certainly do not see the connection now in some sections, for it is not uncommon to learn that though the farmers would vote bonds for school purposes you could not induce them to vote bonds for roads.

It is probable that the most marked influence of good roads on the school question will be in the direction of the development of school centers in each county. It is possible in a large number of counties to have two or three educational centers that will serve the entire county provided there are good roads. The two states, Massachusetts and Connecticut, have the finest public school systems of any section of our country. They have attained this position principally by the centralization of their schools. The little red school house that we used to hear so much about is almost or quite a thing of the past. In Ohio and Indiana, in Rhode Island and Texas, and recently in Mississippi rural schools are combined by agreement, and transportation is provided for pupils living at a greater distance than one mile. Stages or barges start along the main roads toward the school center and picks up the children, getting them to school in time for the morning session.

In the afternoon the stages go out returning the children to their homes. In this way a well built, well equipped, sanitary, warm and attractive school house accomodates the children who live within a radius of about six miles, and every farmer's child has more nearly the school advantages of the child.

In Mississippi there has been some argument against the union of two or more school districts, chiefly on the ground that homes formerly near school became less valuable because of the increased distance to school. But this argument loses sight of that part of the system that provides for transportation to and from school over the longer distance. With good roads provided, so that traffic can pass rapidly and easily about the county at all sessions, the time will come when every progressive county in the southern states will have two or three large, well equipped school centers, and all the county children of school age will attend them.

Hand in hand with the educational aspect of good roads we find the social aspect which is so broad and inclusive that it covers the whole range of rural life. The betterment of rural life is one of the most important problems we face today. The human side of this problem is to make the farmer's life as attractive and remunerative as the city man's life. The south is no longer in a pioneer state, and there is no longer any excuse or reason for farmers or their wives or their children living in the isolation and drudgery of pioneer conditions. Association with his neighbors in town, and country, the possibility of taking easy advantage of superior social conditions that the town generally provides, greater use of the town market both for purchase and sale of local commodities, increased school advantages, the opportunity to enjoy membership in social and fraternal orders, all these demand the annihilation of distance between the farm and the town, between the farm and the school, between the farm and the church.

It is impossible in these days for a farmer to stay on his farm grinding away at the same old system of corn planting and expect to raise one hundred bushels to the acre. He must come out into the open and inquire what men are doing. He must let his outlook widen, he must learn. I have heard an old grey haired farmer declare that it was physical impossibility to get a hundred bushels of corn from an acre. That good old men had been farming since before the war. This type of farmer is scarce now and he must be made to disappear.

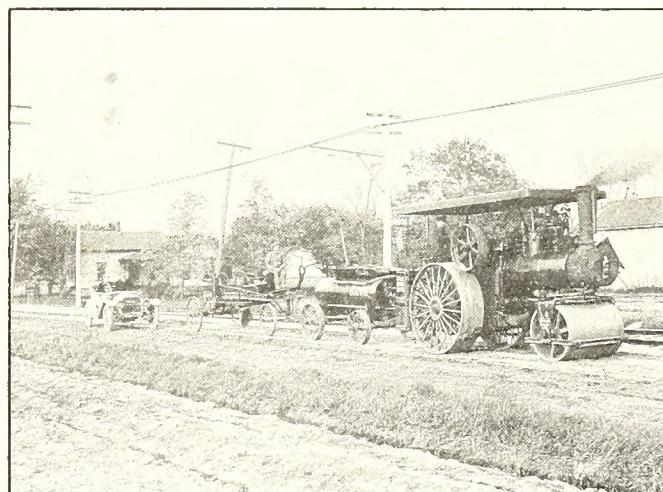
The betterment of all rural conditions depends for its actual accomplishment on free and ready intercommunication. The farmer is much attached to the system of rural mail delivery. How few of them know that the first thing that is done when a petition or plan to establish a route is made is to send an inspector over the roads to see if they are fit and suitable for a rural route! Sometimes routes are discontinued because the roads become so bad. They must be kept up to a certain condition or the farmer doesn't get his mail delivery.

The social aspect of good roads and the educational are closely identified. It is reasonable and convenient that the school center should also be the local church center. The school centers should be at the intersections of important roads, so should the churches, whether these centers are in towns or not.

In some of our largest cities, especially in New York, Boston, Providence, and Rochester, it has long been apparent that our school buildings and our churches have other proper uses than their obvious and original

ones. It isn't especially good business certainly to let an expensive building lie idle all but one Sunday in the month as many of our rural churches do. The depreciation of such buildings is actually greater from rotting out than from wearing out. There is nothing in the nature of things objectionable to putting the church edifice to other purposes than church services. With an established school center, well located with regard to roads and accessibility, churches would soon spring up nearby and the location would become a social center. Meetings of various kinds, lectures, concerts, and social gatherings could be held in the church and school buildings, and the attractions of rural life would be just so much increased.

As to the direct effect on the church bodies and the religious life of the community, the reader can produce the argument without difficulty. The grouping of churches, the combination of forces, would result in larger congregations, stronger membership and support, and more influential church bodies. The increased social life would be a greater attraction to the young people of the section and they—the field from which all future support must be gathered—would be held more closely to the church.



J. I. Case Threshing Machine Company Building Roads With Outfit Consisting of a Ten-ton Steam Steered Road Roller and Perfection Road Grader Also Case Water Tank, With Fuel Bunker on Top and Case Automobile in the Distance

All of these things are possible in greater or less degree if good roads exist, but none of them are possible, not even practicable, unless there are good roads. The farmer in last resort must turn to the public highways to relieve the dead level of farm life, in respect to strictly vocational matters and in all else that contributes to his daily life, his children's progress and development, and the elevation and uplift of his home. The public highways of the country belong first of all to the farmers. Collectively they are his greatest possession, the potential source of his greatest good.

Lincoln county, Miss., has voted \$25,000 of bonds for building roads in the third district.

Russel county, Ala., has voted bonds to the amount of \$100,000 for improved roads.

The city of Fort Worth, Texas, has voted \$165,000 of bonds for street improvement.

Norfolk county, Virginia, has awarded contract for the construction of three miles of macadam to cost \$16,000.

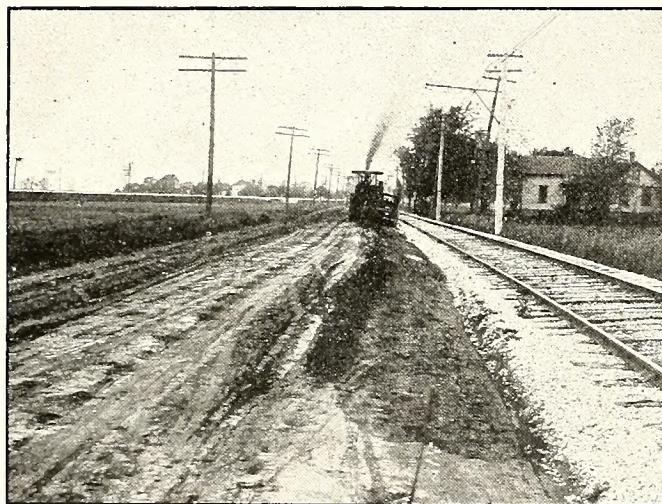
Co-Operation in Road Building Between City and County in Richland

By HON. W. H. GIBBES, Mayor of the City of Columbia

It has always seemed to me that a prodigious amount of time, energy and brain power is thrown away in speeches and arguments urging the necessity of good roads.

As well might we argue about the brightness of the sun, the wetness of water, or the hardness of the diamond. The proposition needs only to be stated to be proved and admitted, for reason need not be invoked when instinct establishes a fact.

Ernest Thompson Seton tells us that even the rabbits in the briar patches cut vines and tendrils from the paths to their burrows; we know of the roads the



Road Graded, But Without Any Stone or Gravel, Between Racine and Kenosha, Wisconsin

bears make for themselves through the canebrakes; and the runs of the deer along the lines of least resistance often point the way for the footsteps of men.

And by the way the designers or engineers who laid out the city of Columbia showed a strange perverseness in their arbitrary laying out of the city according to unheard of standards.

They took the line of a winding river for their base, in place of using the cardinal points of the compass, and attempted to force the main thoroughfare along rugged Assembly street instead of on Main street, the natural artery.

Had civilized man followed the Indian and the animals he would have wrought better in our city planning, and a considerable part of our four square miles would not lie in the waters of our rivers.

Long before the day of Appius Claudius when the great Appian Way and all other roads led to Rome, it was recognized that city and country should join hands in building good roads leading to and from each other, for all of the country people come to town, and many of the town-folks go to the country.

The city and country are mutually necessary and beneficial to each other and good highways throughout

the country to the fields of the farms would be of little good to the dwellers in our rural districts if they should be cut off from access to the streets of town and city which lead to the stores of merchants, the doors of bankers, the buildings of factories, the forum of government and courts, the offices of doctors and lawyers, and dentists and other professional men, the temples of learning, the depots of railroads, and the wharves of shipping where they may buy and sell, and barter and exchange, and deliver and receive, and lend and borrow, and deal and be dealt with, and study and learn, and perform all the varied tasks and duties of life without which life in the country would seem a desert of barrenness and isolation.

So, too, would such a barrier sap the life of the city and cause its industries to perish of inanition.

No argument, therefore, should be needed to cause intelligent men from country and city to join hands and work together, one for all, and all for one, in extending country roads into city streets and city streets into country roads. The benefit being mutual, the contributions in work and study and money should be mutual also, for mutuality of benefit should insure co-operation in proportion to means in producing and conferring of beneficial results.

And co-operation, financially and in the line of organized effort, is necessary to do away with bad roads and to build good ones.

The president of the National Good Roads Association says: "It is a matter of tremendous import that, in the U. S., bad roads are directly responsible for the loss of over a billion dollars a year."

The "American City" comments: "The impetus that has been given of late to the improvement and extension of great radial highways of travel out into the country is encouraging. Both the city and the country profit thereby: trade flows in and congestion diminishes."

In Richland county, of which the city of Columbia and its immediate suburbs from a very small part in territory, say 16 square miles out of 105 square miles, but far the larger part in population and wealth, there are three sources of income for road building:

First. The per capita \$1.00 road tax. This tax has heretofore not been levied in the city of Columbia, the right so to do having been given by law to the city government but not having been exercised. By some influence a bill was passed by the last legislature providing that this tax should thereafter be paid by our citizens to the county treasurer, one-half of the proceeds to go to the city and one-half to the county:

Second. The County Dispensary Profits, of which one-half goes to the city, 30 per cent to the county and 20 per cent to the schools. This looks something like equity.

Third. The general county tax, averaging 2½ mills, which produces some \$40,000.00 of which the city and suburbs pay some \$30,000.00 and odd dollars and all of which goes to the county government.

In the matter of school taxes the city, in 1909, paid \$30,540.41 of which she used \$16,862.98 for her own schools, and, under a system of enrollment, which both

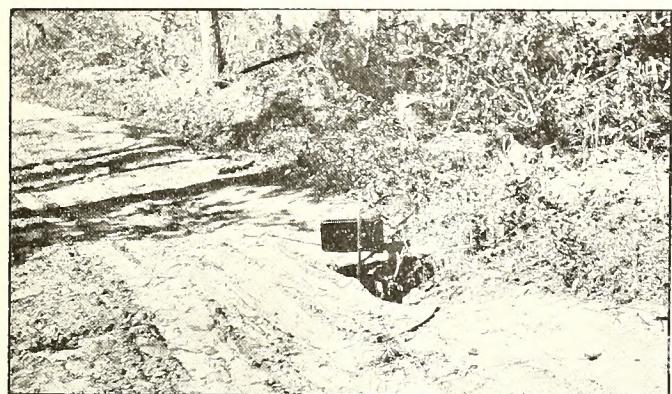
Prof. Tate and Prof. Hand describe as unjust and fraudulent and subversive of the moral sense, was mulleted of \$13,677.43 for the support of the country schools.

Under conditions which have heretofore prevailed in this county there can be advanced no justification for a diversion of the city street tax according to the act which slipped through the 1910 legislature unnoticed by the city government.

The city looks after a great deal of criminal work and turns many culprits over to the county authorities, and furnishes witnesses to convict, for which she receives nothing in return whatever.

She cheerfully supplies the county government with water and sewerage free of charge. Her property is assessed at a higher ratio for taxation than is the property of the county. The vote of her citizens is the deciding factor in electing the county commissioners to office. In the county itself is spent every dollar of tax which the county pays and many dollars of city money besides.

The city streets are as much torn up by heavy wagons hauling in country produce and hauling out supplies as by any other cause. The city cheerfully helps to build the county roads and does not expect the people of the county to contribute a cent towards building the city streets. But she does believe that some of



Scene Near Allendale, S. C. Insufficient Covering Over Clay Pipe, a Trap For the Mule. Folly of Laying Pipe Without Sufficient Covering

her own money should be spent by the county commissioners in carrying and keeping the county highways in order to the county court house.

In place of this what have been the methods heretofore followed by the county commissioners of Richland?

They have built public roads through the county and the incorporated towns of Shandon and Eau Claire, but the building has stopped when the Columbia limits were reached. In this fair, gentlemen of the county government? We believe that those who are in office now will see these things in a proper light and apply the proper remedy, and if legislation be necessary, which I do not believe, that they will ask for that legislation.

As county auditor I pointed out these glaring injustices against Columbia and as Mayor of the City I now re-iterate them.

It seems strange that those who have been elected by the votes of our city tax payers, when once in office have seemed to look upon Columbia as a place apart from Richland county.

Again I say, good country roads increase the value of our farms and save money to our farmers and give them a market for their wares at the same time they bring trade and business to the city. Therefore let us make our city a part of our county and our county a

part of our city. Let us not think of them separately but as one.

Admirable as are many things in Charlotte, N. C., her system of raising street taxes seemed to me to estrange her from Mecklenburg county. The city levies her street taxes within her limits and the county her road taxes outside of those limits.

Let it not be so with Columbia and Richland, but let our county government do its duty by the city as suggested, for Columbia is the sustaining center of Richland without which she would be poor indeed.

The martyrdom, the glory, the chastening and the achievements of the Capital city of South Carolina have given Richland county a place in history, and her coming prosperity and development will give her county also a home in the marble halls of wealth.

\$6,000,000 and Good Roads.

What progress could Georgia make toward an almost perfect system of good roads with an appropriation of \$6,000,000? What progress could Georgia make in that direction, with merely its pro rata share of six millions as divided among the other American states?

The questions are pertinent in view of a recent announcement by Secretary of the Navy Meyer, and The Constitution's reiterated plea that some of the funds devoted to warships doomed to swift obsolescence be expended upon highway construction.

Congress set aside \$6,000,000 for the purpose of building the battleship New York.

Secretary Meyer now reports that that sum is inadequate to the purpose named, and that congress must either pour the money back into the jng and abandon the warship project, or increase the original appropriation by about \$1,500,000.

Six million dollars is not enough to build a battleship that will be turned toward the scrap heap within ten years.

But it would be enough to gridiron almost any one of the American states with a system of good roads, returning dividends past computation for generations to come.

Or, if prorated among the various states, it would start going systematic road improvement that could be depended upon to advance its own best arguments for further appropriations, once the substantial returns became evident.

The Constitution has never advocated a niggardly attitude toward the navy. Whether or not we like it, we are a world-power and must pay the price.

At the same time it does seem, in all conscience, that if we can afford to invest millions yearly in battleships, the usefulness of which is purely hypothetical, it is the part of practical business sense to invest at least a portion of that amount in transportation facilities of permanent and widening value.

For instance: If a man of ordinary business qualifications had the option of investing \$6,000,000 in an ephemeral battleship or a permanent good roads system—what would the answer be?—Atlanta Constitution.

Huntington, W. Va., is asking for bids on a large amount of street paving.

Oklahoma City, Okla., is preparing to grade and pave a number of streets and is asking for bids.

Mecklenburg county, N. C., will add to its already remarkable mileage of good road six miles more. The work will be done on the Pineville road.

Expansion and Good Roads

By REV. GEORGE W. LAY

The condition of the public roads, and the speed at which one can conveniently travel, determine the extent of territory from which people can be gathered for a great many purposes. For example, the number that can gather at a particular church, or attend a particular school house, the number of friends that we feel are near enough for exchange of visits and the number of people who will trade at some town or business center, all depend not only on the distance by road, but also on the speed at which one can travel owing to the condition of the roads, and the time of the year.

Furthermore, this matter of the condition of the roads, and the speed of convenient travel, also determines the value of land which is within convenient distance of some center. There is an important point in this connection which I believe is not generally under-

traveling to a certain centre is five miles on the main road, and one mile on a side road. If we can make the possible speed that can conveniently be maintained twice as great on both the main road and the side road, we would have ten miles on the public road, and two miles on the side road. In the first case mentioned there would be ten square miles in the space five miles long and two miles wide. Whereas in the second case there will be forty square miles in the space ten miles long and four miles wide.

In order to have strong churches, we must be able to gather our members from a large area. In order to have good schools, we must be able to gather at one school a sufficient number of scholars to maintain a school of a good class, with a sufficient number of properly paid teachers. In order to have a pleasant, home-

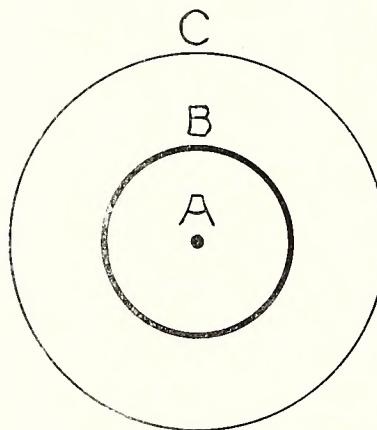


FIG. 1

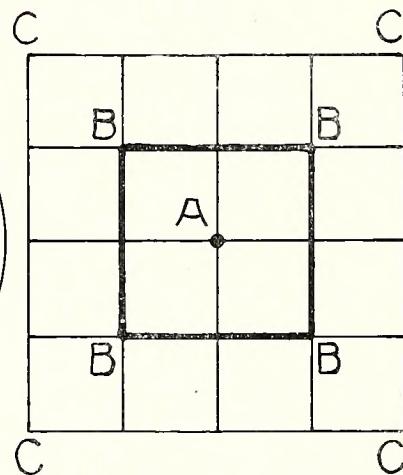


FIG. 2

stood, and which I would like to make clear with the help of the diagram, figs. 1 and 2.

It is natural to think that, if we so improve the roads as to double the speed, we will double the number of people who are available for the purposes named above. As a matter of fact we will multiply that number by four. If the roads are good enough for automobiles, it is possible to multiply the speed by three, or even four; and in that case the area, and the number of people available for the above purposes could be multiplied respectively by nine or sixteen.

In the circle, Fig. 1, the distance from A to C is twice the distance from A to B, but the area included in circle C is four times as big as that enclosed within the circle B. This may not be evident to the eye; but, by glancing at the other diagram, fig. 2 with the little squares, we see that the area enclosed within the lines B B B B, contains four of the squares; but if we take the next largest square C C C C, in which each point is just twice as far from the center A as in the smaller square, we see that, while we have multiplied the distance by two we have multiplied the amount of area by four, since there are now sixteen of the little squares. Any one can carry this out further for himself and find that if you multiply the distance by three the area will be multiplied by nine; and, if you multiply the distance by four, the area will be multiplied by sixteen.

Or you may look at it another way. Suppose that by present conditions the greatest distance available for

like, social life, we must have a sufficient number of neighbors who live near enough to us for us to go to see them, and for them to come and see us.

The influence of good roads on the value of land is exceedingly important. This depends on the distance from town or railroad station, and also on the speed at which travel can be made, which of course depends on the condition of the roads. It should be remembered that, if we make the roads so good that one can travel twice as far in a given time, the amount of land which increases in value on account of the convenience to town, or railway station, will be four times as much as before.

Of course it is not meant that the figures given above are exact, since there are various matters that will come in to vary the relations somewhat. At the same time it is exceedingly important to have it clear in mind that, a given improvement in roads which increases the usual rate of travel, will increase the advantages in a far larger ratio.

It is not out of place to speak of increasing the possible rate of travel fourfold. Already automobiles are common in farming communities in the west; and it is certain that the same thing will be true of the south in time. It is also true that intelligent progressiveness can bring this about very shortly. If we thus multiply our rate of travel by four, we will multiply the number of people who share in any given advantage by sixteen.

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Official Organ of the South Carolina Good Roads Association

F. H. HYATT, President, Columbia, S. C.
FINGAL C. BLACK, Secretary, Columbia, S. C.

VOL. III.

FEBRUARY, 1911.

No. 2.

WHAT THE NORTH CAROLINA GEOLOGICAL BOARD HAS DONE FOR ROAD-BUILDING.

The general assembly of 1909 passed an act appropriating \$5,000 annually to enable the North Carolina Geological Board to advise with the township and county authorities in the building and improvement of the public roads, etc. This has made it possible for the Geological Survey to employ engineers who are competent road builders to take up with the various counties and townships contemplating the construction of improved roads the questions of the proper location of the roads, the best kind of roads to build and the most suitable material available for economic road construction.

Previous to the enactment of this act the work of the survey in regard to the improvement of roads was essentially of an educational nature, consisting principally of lectures and press circulars. Since, however, this appropriation was made, the survey has been able to extend the work to the actual surveying and location of new roads, and the highway engineers have been able to save to many counties and townships a great deal of money by giving advice as to the location of roads and best material and methods to be used in the construction of the roads.

The educational side has been continued and broadened and many addresses have been made by the state geologist and the highway engineer in practically all the counties of the state. As a result of press circulars and good roads literature sent out from time to time, the good roads cause has become a vital issue in a great many counties, and the survey is now making a special effort to arouse interest in those counties which appear to be more or less lukewarm.

The appropriation made for this work is not nearly sufficient to enable the survey to give the assistance that is desired by the counties.

It seems to us that the work already done by the survey has demonstrated the value of the work to the counties and that the counties need aid and desire engineering assistance in the construction of their roads. It is now up to the General Assembly of North Carolina to decide whether this splendid work shall go on and the counties be given that assistance which they want and which will mean the saving of many hundreds of thousands of dollars to the counties and thus to the state.

* * *

RAILROAD CO-OPERATION IN ROAD IMPROVEMENT.

Probably the first railroad in the south to realize the importance of boosting the good roads movement and to get down to actual work at it, was the Norfolk & Western. This great road, through its land and industrial department, began several years ago a campaign of education and it has been keeping it up consistently since. Three years ago this road sent out a special edition of Ward King's split-log drag article to every road supervisor in Virginia and North Carolina and in 1900 a similar article was given wide publicity by this road, 10,000 copies being distributed among the road officials along its line.

The Norfolk & Western did not stop with telling the people along their lines that the road drag was a good thing, but in the shops of the company twelve of them were made and sent to different points along the road to do actual service on the dirt roads. In a number of cases these road drags aroused so much interest in road betterment that bond issues were voted and macadam roads constructed. Dirt roads brought to their highest state of efficiency gave the farmers along the Norfolk & Western an idea of what really good roads were and they were not satisfied until they got them.

The Norfolk & Western did not stop here, but went so far as to enlist the interest and support of the Chesapeake & Ohio Railway and the two purchased a complete road-building outfit, consisting of steam-roller, rock-crusher, screens, bins, steam drills and other machinery and this outfit was loaned to districts tributary to the lines of the two railroads. In this way much good has been done and many miles of good road constructed.

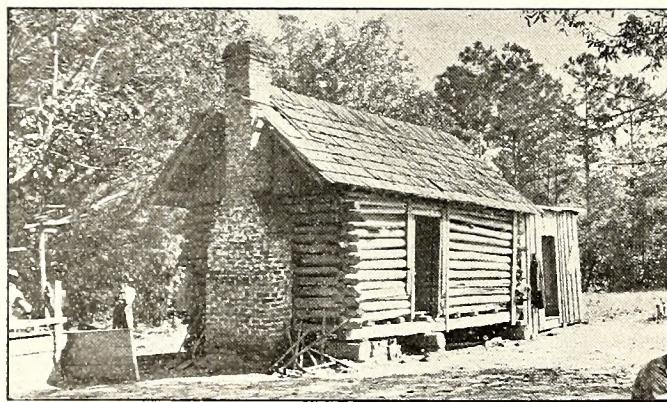
The state highway commissioner of Virginia, Hon. P. St. Julien Wilson, has found in the Norfolk & Western a staunch ally in every undertaking directed toward the building up of the state and in road work the railway has been able to assist greatly by transporting convict gangs, camp equipment, etc. In a number of cases the road has transported slag, stone and other material for road-building at greatly reduced prices and in some cases free, where the roads were to be built from stations on their lines out into the adjoining territory. The board of directors this year set aside \$2,000 to be divided into sums of \$200 each and appropriated to towns on the road which start roadbuilding, macadamizing from the depot into the country.

What the Norfolk & Western has done and is doing,

other roads are contemplating. The Pennsylvania and many of the big northern lines, are deeply interested in road building and in the south the Southern, Seaboard and Atlantic Coast Line are beginning to take great interest in the work. This is but another example of the vast scope which the road campaign has assumed and it serves to show, too, something of the character of the forces that are lining up behind the good roads movement. Backed by the railroads of the country, good roads sentiment will eventually prevail in every community in the United States.

Meeting of South Carolina Good Roads Association.

One of the most interesting and one of the most important road meetings that have been held in the south in recent years was that of the South Carolina Good Roads Association at Columbia, S. C., January 15. The attendance was representative, every county in the state being represented and there was snap and go to the proceedings from the welcoming address of Mayor Gibbs to the end. Beverly Herbert, president of the Columbia Chamber of Commerce, and Mr. F. H. Hyatt, president of the association, made fine speeches and several other local men added interest to the meeting.



Walterboro, S. C. A Poor Camp, No Inspection in This State. Camps of This Sort Are Often Set on Fire by the Convicts in an Effort to Escape
Guard Quarters Are No Better

Mr. M. V. Richards, land and industrial agent of the Southern Railway, made one of his fine addresses and he was followed up by Mr. J. E. Pennybacker, secretary of the American Association of Highway Improvement, who made a telling speech on "The Advantages of Co-Operation between State Highway Associations and the American Association of Highway Improvement" and made many friends for his great organization.

The association re-elected Mr. F. H. Hyatt president for 1911 and Mr. Fingal C. Black was elected secretary. The road supervisors of the various counties were named as vice-presidents.

A number of very interesting papers were read and some of them will be published in Southern Good Roads. One appears in this issue.

The Pike Commission of Cocke county, Tenn., has awarded contracts for the construction of 35 miles of macadam and grading 18 miles of dirt pike.

Mr. Henry B. Browne, Asso. M. Am. Soc. C. E., has resigned as Assistant Engineer to the State Board of Public Roads of Rhode Island to accept the position of Assistant Engineer with Arthur H. Blanchard, Consulting Highway Engineer, Providence.

A Factor in Good Roads Work.

The accompanying illustration shows the Wood Rock Drill, which has been doing no small part in helping along the cause of good roads, and the development of rock quarries.



The drill is made by the Wood Drill Works of Patterson, N. J. and is represented in the south by E. F. Craven, of Greensboro, N. C.; W. E. Austin Machinery Co., Atlanta, Ga., and Southern Machinery & Equipment Co., Lynchburg, Va.

The drill holds various records for drilling work and is used extensively on the Panama Canal, the United States Reclamation Service, various fortification works, and in some of the largest mines and quarries of the country.

Many counties of the various southern states have purchased the drill through their Boards of Public Works, who highly recommend the drill.

Owing to the large volume of business secured in 1910 the concern has added a large addition with modern up to date equipment so as to be better prepared to take care of the trades requirements this season.

THE CASE CAR.

At the recent automobile show held at Madison Square Garden it was unanimously conceded that the sensation of the show was the simplicity of the Case car.

One of the most popular cars of last year was the Pierce-Racine, and the present Case car is identically the same car, the factory of the Pierce Company being now under the management of the J. I. Case Threshing Machine Co. of Racine, Wisconsin. Although the Case car is not generally known in the United States, the enormous interest shown in this car and the large number of orders taken at the show have so encouraged the Case Company that they feel sure the Case car will be one of the most popular cars in America in 1911.

The case car has earned both the reputation for simplicity and silence, there being no freakish ideas embodied in its construction, which, although extremely light, is nevertheless very strong and rigid. Through special designs in valve motions, extreme silence is obtained in the motor.

When the J. I. Case Company decided to incorporate the selling of automobiles in their organization, they were one of the oldest engineering firms in America, doing business since 1843. It was decided to buy the very best automobile factory and to turn out a Case car that would be unequaled by any other builder of automobiles, and the favor with which the public have looked upon the Case car is a compliment to the brains of the Case organization when they selected and acquired the Pierce-Racine.

Mr. Paul D. Sargent has recently resigned as State Highway Commissioner of Maine to accept the position of Assistant Director in the United States Office of Public Roads.

Spartanburg, S. C., has asked permission of the state legislature now in session to issue bonds for \$50,000 for street improvement.

Points to Emphasize in Connection With Public Road Work

By PROF. W. C. RIDICK, of the Civil Engineering Department A. and M. College

On all occasions, we should, in my opinion, emphasize the following points:

1st. That all road work should be done in accordance with a broad comprehensive plan, which will ultimately secure a complete system of roads for every neighborhood, county, and state, and in fact for our whole country.

A few years ago I advocated as of prime importance the improvement of roads radiating from trading centers, thinking that the railroads would take care of the long hauls. I am no less convinced now of the importance of these radiating roads or local systems, I might

It is so shortsighted as to be almost comical to temporize in the location of a road and spend a lot of money on a road that can never be satisfactory and which will eventually have to be relocated and the work already done thrown away.

3rd. The location and construction should be such as will give easy grades, and thorough drainage.

The work above mentioned is of a permanent nature and should be done as for all time.

4th. Put on the best surface material available. This can be renewed and improved as the traffic demands and the money can be obtained.

5th. To secure the above results, we must have intelligent supervision by men of such technical training and experience as will fit them for this work.

6th. Have we not reached a point where we may begin to talk about beautifying our roads as we improve them. This can be done easily and cheaply by planting trees on either or on one side. And while we are beautifying why not capitalize them by planting useful trees—pecan, walnut, etc.

There are at least 200,000 miles of road in the southern states east of the Mississippi, which ought to be improved. Suppose we plant pecan trees 60 feet apart on either side, we will have 175 trees to the mile, or a grand total of 35,000,000 trees. Suppose each tree produces \$20.00 worth of pecans (single trees have been known to produce from \$75.00 to \$100.00 worth,) the figures become so stupendous that I forbear to give them; but they equal the value of the cotton crop of the south.

Palatka, Fla., will spend \$16,000 in street work.

Hardin county, Texas, has voted \$100,000 of bonds for roads.

Augusta, Ga., is asking for bids on a great deal of street work.

Amherst county, Va., has voted \$135,000 of bonds for road improvement.

Baltimore, Md., is asking for bids for grading and paving four streets.

At Hugo, Okla., \$120,000 will be spent in constructing two miles of pavement.

Easton, Md., announces that it will spend a great deal of money on paving its streets.

Cocke county, Tenn., has been advertising for bids for the construction of 35 miles of macadam roads.

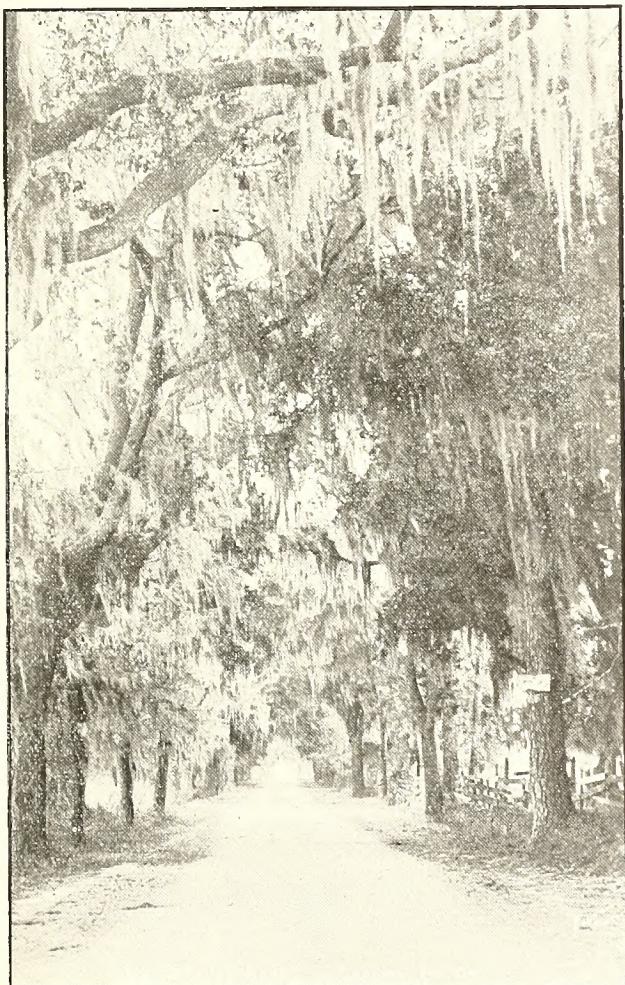
The Union county road commission, Mississippi, is asking for bids for improvements on 300 miles of roads.

Lonisville, Ky., is asking for bids on sidewalks, streets, etc., the total estimated cost being about \$50,000.

St. Petersburg, Fla., will lay 45,000 square yards of brick paving and 43,000 linear feet of granolithic pavement.

Pntnam county, Tenn., will hold an election on February 25 to decide as to a bond issue of \$100,000 for good roads.

At Eral, Ark., a good roads improvement association has been formed to see to the construction of 70 miles of roads which are to cost \$2,000 per mile.



White Bluff Road, Chatham County, Ga.

call them, but the coming of the automobiles has made it just as necessary that these systems be connected to give a continuous system between counties and states, as is the purpose of your great Appalachian Boulevard.

2nd. No trouble or necessary expense should be spared to secure proper location or relocation of all roads to be built or improved. If we locate them properly they will be kept there for all time to come, and whatever work is done will not be wasted.

Road Laws and Road Building

By HON. MAURICE O. ELDRIDGE, of the Office of Public Roads, United States Department of Agriculture

I wish to call your attention briefly to the object-lesson road which was built near the entrance to the Exposition grounds, under the direction of an expert from the Office of Public Roads. I doubt whether all of you saw the road this morning as you passed over it rather rapidly in automobiles. It is located on Rutledge Pike about a half block from the entrance to the exposition grounds. The road was built in four sections. The first section was treated with Tarya, the second section with Atlanta gas tar and the third section, located just where you turn to enter the grounds, was treated with Standard roadbed oil. The fourth section was plain macadam. The rock used in each of these sections was of the same quality. The road expert in charge of the work endeavored to build these sections of road in such a way that they would be suitable for traffic conditions in this particular section of the country. The exposition authorities requested that we build several different kinds of roads, such as Telford and sand-clay, but it was thought best to build sections of road which could be easily duplicated here, and which could be built as nearly as possible of local materials.



Near Winchester, Va. Road to Senator Lupton's Farm
Dragged With a Wagon Tire

In the construction of these sections of road the old roadbed, which was in an exceedingly bad condition, was first spiked up, reshaped and rolled. A layer of No. 1 rock was then spread to a depth of about 6 inches. This rock was the very best that could be found in the county. It was iron limestone, and is superior in quality to the limestone and marble ordinarily used in this county for road building.

The first course was rolled down to about $4\frac{1}{2}$ inches in depth, and on top of that about 4 inches of No. 2 rock was spread and rolled. Instead of covering this with screenings, as is the ordinary practice in building straight macadam, the bituminous substance was then applied by hand at the rate of about $1\frac{1}{2}$ gallon to the square yard.

Applying the bitumen by hand is a rather laborious task, but as these sections were only short samples, it was not deemed advisable to purchase a large tank with which to heat and spread the oil and tar. The bituminous materials were heated in large caldrons and were spread with coal buckets having spouts so arranged

as to spread a wide thin film of the material. Upon this was spread about $\frac{1}{2}$ inch of clean screenings free from dust. The screenings varied from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch in diameter. The surface was then rolled, after which $\frac{1}{2}$ gallon more of bituminous material was spread. Another thin layer of screenings, and a thorough rolling completed the road.

The same process was used in building each of the three samples of bituminous roadway. This method of treatment is ordinarily referred to as the penetration method. There are various other methods of using oil and tar on roads. These are illustrated by the models which I invited you to visit in the main building. It is thought by the experts of the office who have given this subject considerable thought, that the method used on Rutledge Pike is one of the cheapest and most practical yet devised. It is especially suited to main lines of highway like the road over which you passed this morning—Kinston Pike. That road and others like it in this county should be similarly treated, because you will notice that the fast moving automobiles raise great clouds of dust which is not only destroying the surface, but which makes the roads very disagreeable to travel. It has been found by the Office of Public Roads that it is only the machines which move at the rate of speed exceeding about 20 miles an hour that injure the macadam roads. The shearing action of the tires of fast moving automobiles against the surface of the road seems to be the chief cause of this trouble. The wind and the rain completes the damage after the surface is once loosened.

Let me discuss for a few moments the resolutions which were passed here this morning. In the preamble, attention was called to the extreme localization of road affairs in the south, to the lack of skilled supervision, and to the system which prevails in many parts of the south of working out the tax on the public roads. Now in my judgment, these evils lie at the bottom of the whole matter, and it is my opinion that we will never obtain improved roads in the south until they have been eliminated. The only counties in the south which have built up a system of improved roads are the ones which have put their road affairs in the hands of skilled engineers or competent superintendents. The resolutions urged that all road taxes be paid in cash, and this is certainly a wise provision. It is difficult, however, to induce the legislators to agree to this plan, because many of the farmers are opposed to it, but certainly we ought to aim toward this ideal, we road enthusiasts, and try to have the road tax paid in cash. You know that so long as road taxes in the south are paid in labor that we will never make very great progress toward improved roads.

I used to work on the public roads in this state when I was a boy as a substitute, for which service I received a man's wages. We used to turn out in the fall of the year, in September or October, when the roads were hard and dry, and pile up clods, sods, and vegetable mould in the middle of the road, and if there were any mudholes we would usually haul large stones from adjacent fields and fill them, and that would usually make two mudholes, which were filled in the same way the following year. You will find this same practice in use to-day in many counties in the Appalachian region of the south. I know that this is true, because I

have traveled through most of these counties. Last fall I accompanied Congressman Austin through this congressional district, and Col. Brownlow through his district in Upper East Tennessee, and I have in the same way accompanied other congressmen through their districts where campaigns of education were carried on in favor of better roads and better farming. In all of these districts and counties I have found the system which I have just described to you still in use. The taxes are usually worked out in the fall of the year, and if the county is so fortunate as to have a road machine, four or six of the largest horses or mules obtainable are hitched to the machine and they usually continue the same old method of piling clods, sods, weeds, vegetable mould, and leaves into the middle of the road. This turns into dust if the dry weather continues and into mud as soon as the winter rains come on.

If this work were done at the right time of the year, in the spring, when the ground is soft and damp, two horses and two competent men could be made to do the work which six horses and three men are required to do later in the season. Furthermore, the road, if worked when damp, would pack down and bake into a crust which would make a good road all summer and a comparatively good road all winter if it is not too heavily traveled. The farmers are often so busy, however, in the spring of the year, that it is difficult to induce them to turn out at that time to work out their taxes, and this is one of the strongest reasons for a system of cash taxation, for then suitable machinery and competent men could be employed to do the work at the right time in the year.

A few days ago I had the pleasure of addressing the county court of Polk county of this state, and while in Polk county I heard that they had consented to have one of the road machine companies send a representative to them, in order to build a mile of earth road, so as to show them how to use a road machine. I asked the chairman of the county court whether he had any one who could run a road machine, and he replied that they did not even have a road machine. Polk is one of the best counties in the state and I was very much surprised to find that they did not have a road machine. I told them at that meeting that a road machine was to the earth road builder what the self-binder is to the wheat farmer, and that I would just as soon try to build a mile of earth road with pick and shovel as to cut 10 acres of wheat with a sickle.

Not far from the courthouse at Polk county, we found a bad place in the road which had recently been mended by the pick and shovel method. The road had really been injured rather than benefitted. I was told that it took 10 men a whole day to fix that mudhole. With one road machine and two good mules the hole could have been fixed, and fixed properly, in a half day and a half mile or more of earth road built in addition.

Another of the resolutions passed this morning recommends that there should exist no ratio between the property tax and the personal tax. You know that in the state of Tennessee there exists, according to law, a ratio between the labor tax, as it is called, and the property tax; that is, for every 2 cents levied on property, the road hands are required to work one day on the public roads. In other words, if the road hands are required to work 5 days, then that fixes the road tax at 10 cents on each \$100 worth of personal property.

This method of assessing road taxes has necessarily kept the property tax in this state down to the minimum, because no one could expect the road hands to

work more than 5 or 6 days per annum on the public roads, in fact 6 days is the limit fixed by law. The result is that the average road tax in Tennessee is 10 cents on the \$100, which is lower than any other state in the Union except Oklahoma. This does not ordinarily raise enough revenue to keep the earth roads in proper repair, and it is therefore necessary in most counties to issue bonds in order to improve the roads permanently. I have been unable to discover any real reason for establishing this ratio between the labor tax and the property tax, unless it is to keep the rate at the lowest possible minimum.

Every county ought to be permitted, if it chooses to do so, to assess as much as 50 cents per \$100 for public roads without reference to the number of days its non-property holders are expected to work on the public roads. If it is considered wise that every able-bodied man should be required to work 6 days on the public roads, then let it be provided by law that he may pay in cash, say 50 cents for each day that he does not work. No one will deny that \$3 in cash, wisely and



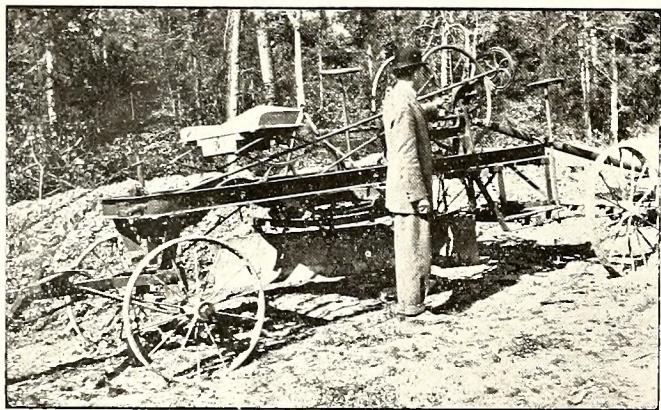
Macadam Road, Near South Keene, N. H. Horses Were Trotting Up-Grade With 6,000 Pounds When Driver Was Requested to Stop to Permit Taking of Picture. Note Wide Tires

judiciously spent for skilled labor or for modern machinery, will accomplish more than 6 days' work with pick and shovel by the average road hand. The statute labor or military system is only a modification of the system which was in use in Queen Elizabeth's time in England. Let us, therefore, abolish that system of working out the tax on public roads, and have all road taxes paid in money.

These resolutions urge the adoption of state-aid laws. Fifteen years ago the question of state-aid was brought up in New Jersey at a meeting of farmers. These farmers requested the legislature to pass a law which would give them some help from the state. The legislature passed an appropriation for the first year of \$50,000, and at the same time created a State Highway Department to take charge of the expenditure of the fund. The law provided that the state pay 1-3 of the cost of improving main highways selected by the county and state authorities, and that the counties pay 1-3 of the cost, and the township or property owners pay 1-3. That law worked well, so well in fact, that a few years later the appropriation was considerably increased, and it has been increased many times since. At the present time the state of New Jersey is spending from the state treasury about one-quarter million dollars a year, and they have built over 1,000 miles of road under this plan. The state-aid plan worked so well in New Jersey that 32 states have since adopted the principle of state aid, or state supervision, and bills are now pending in many other states.

The Virginia method of state-aid is probably more applicable to the southern states than any other. The Virginia law combines the money aid feature with that of convict labor, that is, if the county does not desire aid in the form of money, then they can take it in the form of convict labor the state paying one-half the cost, either in cash or in convict labor.

I was somewhat surprised this morning when you voted down the resolution condemning the use of convict labor in the mines and on the farms and in manufacturing establishments. That resolution, I think, was all right, because it condemned the use of convict labor where the products of such labor were sold in competition with free labor. Nothing was said in the resolution in the way of criticism of the use of convicts in farming, in mining, or in manufacturing, providing the products are for the use of state institutions. At the present time there are a large number of convicts employed by this state at Brushy Mountain in the state mine, and I am informed that these mines are being operated at an actual loss to the state. Up to the present year, however, the mines have paid handsome returns. These mines could probably be disposed of at what they are worth in the open market, and the convicts could then be placed upon the public roads where



Walterboro, S. C. A Tribute to Incompetency. A Second Hand Machine Cracked in Several Places, Bought For \$750.00 by the County. List Price of Same Machine Brand New is But \$210. How the Tax Payers Can Get Soaked and Not Know It

they ought to be. Many students of prison reform have now come to the conclusion that convicts ought to be used on works of internal improvement such as building levees, public roads, etc.

There is a certain class of long term prisoners who cannot safely be employed on public roads. These could be utilized, however, in crushing rock for road building. There are many counties in the western part of Tennessee where no road-building materials are available. Madison county, for instance, has had to secure material from the state of Illinois, shipping it 125 miles by rail. A force of long-term convicts could be used to great advantage in a gravel pit, surrounded by a stockade, in middle Tennessee, where there is plenty of gravel suitable for road building. This material could then be quarried, crushed, separated, placed on cars and shipped to all of the counties west of the Tennessee river. The railroads would probably take their pay for hauling the same in ballast, as is done at the present time in the state of Illinois. In this way the various counties would have the material laid down at their doors practically free. This would have the effect of reducing the cost of gravel roads in West Tennessee about one-half and would therefore be a sub-

stantial form of state aid. In Middle and Eastern Tennessee, where there is plenty of material available in every county, the state and county convicts could be used in building the roads, as well as in preparing the materials therefor.

Up to a very recent date all state convicts in Virginia have been used in making shoes. The prisoners were leased to a corporation at about 30 cents per day, but they were worth to the corporation from \$1 to \$1.50 per day. In Virginia they now use most of these convicts in road building and the commonwealth receives the benefit of this labor instead of the corporation. I am informed that Captain Hooper, one of the candidates for governor, is favorable to the use of convict labor for road building, and so is Governor Patterson, and there is a strong public sentiment in this state toward using prison labor in this way.

The resolutions adopted this morning further urge the passage of state-wide laws permitting any county to issue bonds for road purposes. There are many good counties in the Appalachian region of the south where the assessable valuation is so low that it is practically impossible to build a system of improved roads from current revenues, even though the rate be extended far beyond that provided by law. Already about 15 counties in east Tennessee have been compelled to issue bonds for this purpose. These bond issues are usually adopted, however, in spite of much opposition, especially in those counties where the country people have had no opportunity to observe the beneficial results accruing from improved roads. In one county in upper East Tennessee, some of the citizens were so bitter in their opposition that they tried to break up the good roads meetings by throwing stones into the windows of the schoolhouses where the meetings were being held. In that county the corporations pay 82 per cent of the taxes—yet the country people were almost unanimously opposed to this bond issue.

You would be surprised at the arguments which are often made against bond issues. Some of these are so absurd as to be ludicrous, but they are often so effective with the country people as to defeat the proposition. In Granger county, Tennessee, last winter, I heard a disgruntled farmer say, among other things, "Boys, they will take the hat off your head, the coat off your back and the shoes off your feet if you issue these bonds. I know of a man down in Hamblen county who paid \$15 poll tax last year." Now Hamblen county is one of the counties where they had issued bonds. It was ascertained later, from the chairman of the county court of that county, that the man who had paid \$15 poll tax in one year had not paid poll tax for many years and that he had simply paid back taxes. Furthermore, the poll taxes can only be used in Tennessee for school purposes. A thousand dollars worth of personal property is exempt from taxation, so that the argument that personal effects of poor people may be attached for road taxes is absurd. In Tennessee the funds for the purpose of paying principal and interest on bond issues are paid for out of revenues derived from property taxes. All the property in the county, both city and country alike, is subject to taxation for this purpose, which is not the case where current revenues are used for building roads.

In Sullivan county, Tennessee, for instance, the city of Bristol pays about one-half the cost of principal and interest on the bonds. This seems to be a good arrangement, for the reason that the town folks appear to be more interested in improved roads than the country folks. They receive their share of the benefits in

the use of the roads and the advantage of better market facilities which the good roads bring to them, and consequently they should be permitted or required to pay a portion of the cost.

Three different campaigns of education were conducted in Sullivan county, however, before it was possible to issue the bonds. The county court was in session when the first road meeting was held, but the various magistrates refused to attend. The chairman of the court said that there was no use to talk to them, that their mind was made up on the subject, but if we wished to hold a meeting we could do so in the upper room of the courthouse. Another meeting was held in the same place, Blountsville, about a year later, which some of the magistrates attended; they had become interested in the subject in the meantime. Another year rolled by and another meeting was held at the same place. At that meeting the county judge made a speech from the bench, and a thorough campaign of education was inaugurated. Meetings were held in the schools and churches throughout the county. The county court, being still skeptical of the proposition, refused to issue the bonds as they had been authorized to do by the legislature, but was willing to let the matter go before the people. The election was held and the proposition was carried for bonds by a small majority, the city of Bristol giving that majority.

The road between Bristol and Blountsville was built. The road had not been entirely completed when the county court, realizing the benefits resulting to the county met, and by unanimous vote of 42 magistrates, decided to issue \$200,000 more bonds to improve all the main lines of highway throughout the county. The results obtained in Sullivan county illustrate the importance of an object-lesson and of persistence on the part of good road enthusiasts.

I am taking too much of your time on this proposition, but let me say in conclusion, that there are several counties in the south that will probably issue bonds in the near future, and you should have what you call for in these resolutions—state-wide laws permitting any county which chooses to do so to issue bonds up to a certain limit of its taxable valuation to build permanent roads and bridges. At the present time, any county wishing to issue bonds is compelled to call upon the legislature for authority, and in order to obtain that authority it is sometimes necessary to wait for two years, the legislatures only meeting in some of the states every two years. If the proposition is voted down, as it very often is the first time the matter is submitted to the people, it is necessary to wait two more years; but with state-wide laws permitting any county to issue bonds at any time, it would be much easier. Furthermore, a general law, broad enough for all counties, would be more nearly in accordance with state constitutions which mainly prohibit special legislation.

I have already taken too much time for such a late hour, so I thank you for your attention.

COUNTY GOOD ROADS ASSOCIATIONS.

Recently the following County Good Roads Associations have been organized:

TENNESSEE—The Knox County Good Roads & Park Association was organized on the following officers:

President, Cyrus Kehr, Knoxville; Vice-President, N. E. Logan; Treasurer, A. C. Harmon.

The constitution adopted by this association is somewhat different from that of other county associations

that are affiliated directly with state associations. As this constitution may be of interest to other counties that may wish to organize for similar work, it is given here in its entirety:

CONSTITUTION ADOPTED.

The constitution and by-laws are as follows:

"The name of this association shall be "The Knox County Good Roads and Park Association, and its home office shall be at Knoxville, Tennessee.

"Realizing the need and importance of the improvement of the public roads in Knox and adjoining counties, this association is organized: (a) to promote proper and necessary legislation; (b), to create among all classes enthusiasm for good roads and public parks; (c), to encourage other counties in the state to organize good roads associations; (d), to gather and disseminate knowledge bearing on location and construction of good roads and to do all things possible to promote the betterment of existing roads and construction of new thoroughfares on economic and scientific plans; (e), to promote a system of public parks for the city of Knoxville.

"The membership shall consist of persons interested in the building and maintenance of good roads and public parks and shall be divided into two classes: viz. active and associate.



Typical Well Kept Gravel Road. Near Dublin, N. H. Note the Reversed Curve and Lateral Retaining Wall. Roads That Advertise Dublin, N. H.

"Active members shall be such persons as shall pay to the association monthly dues of twenty-five cents each.

"Associate members shall be such persons as shall pay \$10.00 or more annually to the association and do not desire to be active members.

"The government of the association is hereby vested in a board of directors, who shall have control of its business and management. This board shall consist of the president, vice-president, treasurer and six directors, who shall be elected from year to year at the annual meeting the first Tuesday in March and their terms of office shall be for one year or until their successors are elected and qualified.

"The board of directors shall elect a secretary and regulate his salary. He shall be counted to make a quorum and he shall vote on all questions not affecting his salary or retention in office.

"Five members of the board of directors shall constitute a quorum.

"The president shall preside at meetings of the association and of the board of directors. He shall, at the annual meeting of the association and at such other times as he shall deem proper, communicate to the association or board of directors such matters and make such suggestions as may, in his opinion, tend to

promote the welfare and usefulness of the association, and shall perform such other duties as are necessarily incident to the office of president. He shall, as soon as practicable after his election, appoint a committee on membership, a committee on publicity, a committee on legislation, and such other committees, as he may desire, to further the work of the association.

"The vice-president is expected to attend all the meetings of the association and of the board of directions and, in the absence of the president, perform his duties."

NORTH CAROLINA COUNTY ASSOCIATIONS.

Anson County Good Roads Association—U. B. Bla-
lock, President, Wadesboro, N. C.; M. L. Horne, Vice-
President, Polkton, N. C.; T. V. Howell, Secretary &
Treasurer, Peachland, N. C.

Columbus County Good Roads Association—G. Her-
bert Smith, President, Cronly, N. C.; W. R. Davis, Vice-
President, Whiteville, N. C.; J. G. Thompson, Treas-
urer, Vineland, N. C.; K. Clyde Council, Secretary,
Wananish, N. C.

Craven County Good Roads Association—R. A. Nunn,
President, New Bern, N. C.; J. L. Bland, Vice-Presi-
dent, Vanceboro, N. C. R. F. D.; W. A. Barrington,
Vice-President, New Bern, N. C. R. F. D.; G. V. Rich-
ardson, Vice-President, Dover, N. C.; J. S. Morton,
Vice-President, North Harlowe, N. C.; W. Z. Boyd,

Vice-President, Croatan, N. C.; J. S. McGown, New
Bern, N. C. R. F. D.; Daniel Lane, Vice-President, New
Bern, N. C. R. F. D.; Jesse Atkinson, Vice-President,
Cove City, N. C.; W. G. Boyd, Secretary, New Bern,
N. C.

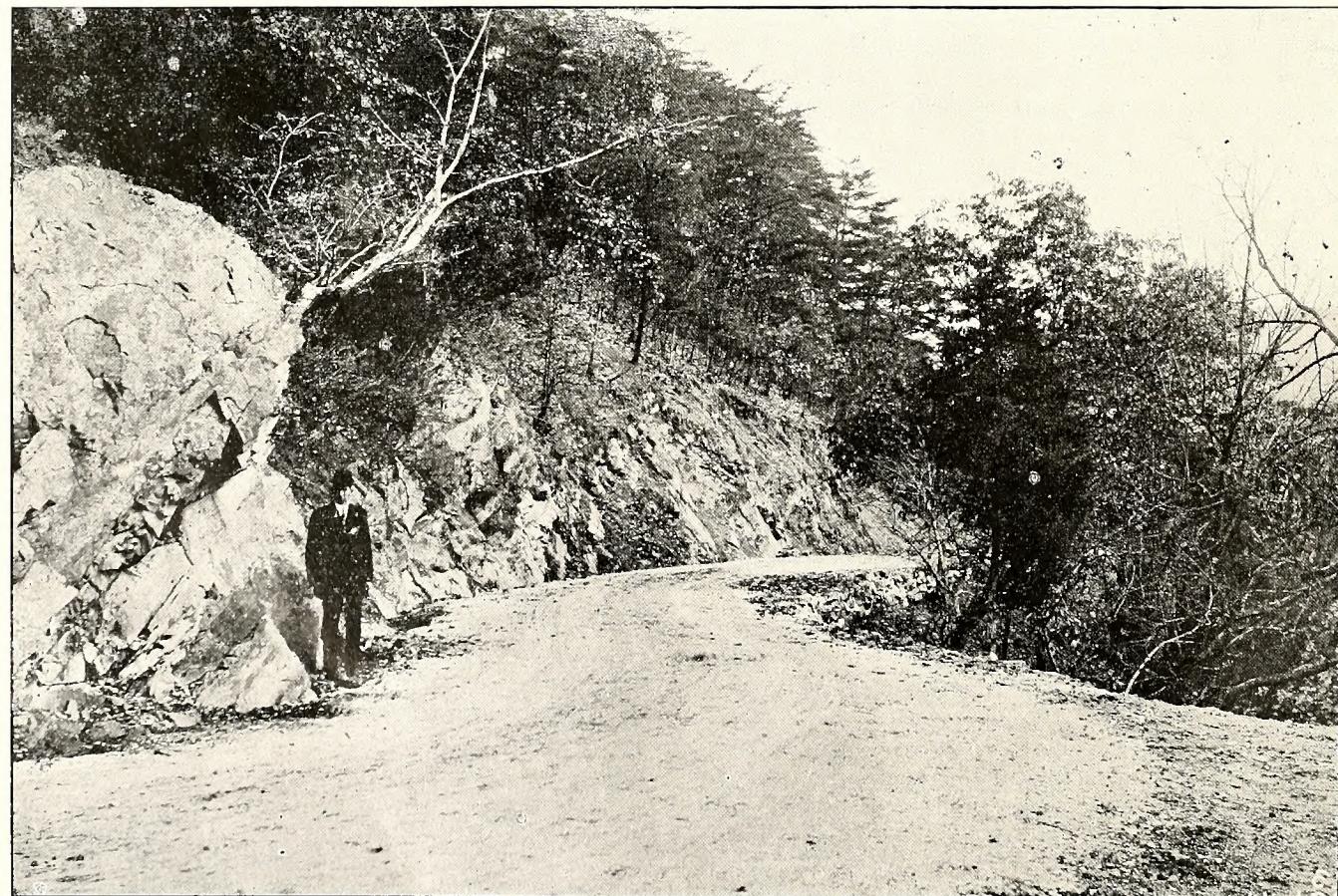
Robeson County Good Roads Association—A. E.
White, Secretary & Treasurer, Lumberton, N. C.

Rockingham County Good Roads Association—A. L.
French, President, Byrdville, Va., R. F. D. No. 2.

Orange County Good Roads Association—Frank
Nash, President, Hillsboro, N. C.; Jno. F. McAdams,
Vice-President, Mebane, N. C., R. F. D. No. 4; T. Wing-
gate Andrews, Secretary & Treasurer, Hillsboro, N. C.
Directors—Frank Nash, Hillsboro, N. C.; J. F. Mc-
Adams, Mebane, N. C., R. F. D. No. 4; T. Wingate An-
drews, Hillsboro, N. C.

Randolph County Good Roads Association—J. E.
Williamson, President, Wiley Ward, 1st Vice-President;
E. H. Morris, 2nd Vice-President; S. W. Loughlin,
Secretary and Treasurer. Executive Committee—D. B.
McCravy, C. L. Holton, Wiley Ward, W. J. Miller, W.
F. Redding, W. J. Scarboro, H. M. Worth, P. H. Morris.

Guilford County Good Roads Association—J. Van
Lindley, President, Greensboro, N. C.; F. N. Tate, 1st
Vice-President, High Point, N. C.; J. L. King, 2nd Vice-
President, Greensboro, N. C.; S. L. Trogden, Secretary
& Treasurer, Greensboro, N. C.



Showing Side Hill Excavation in Solid Rock, Cumberland Gap, Tennessee

Wake County Roads---What Shall We Do About Them?

By DR. R. H. LEWIS, Raleigh, N. C.

Since my services as chairman of the street committee of the board of alderman of our city of Raleigh 25 years ago I have taken a deep interest in road improvement and although for many years the claims upon my time of my professional life have prevented an active participation in the movement, that interest has remained unabated. I therefore could not refuse the request to deliver a short address on this most important subject.

The question before us today is, What shall we do now? That the present condition of affairs is most unsatisfactory you will all admit, and the purpose of this meeting is to find the best remedy for it and to decide on the best means of promoting intelligent and permanent progress.

The value of good roads to the whole county, to the city and to our towns by increasing trade and to the country districts by their effect in advancing education, religion and the social life is so plain to any thinking man that it is unnecessary to argue the matter. We all want them. How shall we get them?

There is only one way, and that is to make up our minds to pay for them. Good roads like most good things are apparently costly, but as a matter of fact cheap. No investment by a community, except in education, will bring so large a return. But how are we to get the money? By a bond issue. There is no other satisfactory way. For twenty years we have been trying to build good roads out of the annual road tax, and although that tax has been increased from 8 cents on the hundred and 24 cents on the poll in one township, to 25 cents on the hundred dollars for the whole county the condition of our roads after twenty years, while much better than it was, is still such that we are assembled here today to devise some method of solving the problem. Some people are as scared of bonds as a colt is of an automobile. But is there any reasonable ground for such fear? None in my opinion, and if you will walk up to them and carefully study them you will agree with me I am sure. Let us see how it would work out with an issue, say of \$300,000. The amount required annually to pay the interest at 5 per cent and to create a sinking fund for their redemption at the end of thirty years would be about \$28,000. Our present road tax based on a property assessment for the whole county of 22 million dollars, of which almost exactly half is in Raleigh township, is \$58,000 a year, which, after meeting the requirements of the bonds, would leave \$30,000 for the repair of all roads and bridges. The value of property is rapidly increasing and with every quadrennial assessment the amount of road tax would be materially augmented but as the annual demand upon it by the bonds would remain the same more could be done for the outlying districts. With the \$300,000 from the sale of the bonds from 100 to 150 miles of macadamized road could be built in a short time while with the \$28,000 required annually to take care of them only 9 to 14 miles could be constructed each year. If the width of the macadam

is reduced the length in miles would of course be proportionately increased.

To secure the judicious expenditure of this large sum great care should be observed. I believe that the whole management of the roads should be in the hands of a special commission of three of the best men in the county, well known for their fair mindedness and sound common sense, to be named in the bill to be presented to the legislature, and to serve not less than four years. Not being elective they would be above political pulls and would be untrammelled in their selection of a thoroughly trained road builder—a real expert. This would be their most important duty, for the success of the work would depend upon the ability and fitness of the man in immediate charge more than upon anything else.



Near Winchester, Va., Toll Pike, Showing Crude and Old Fashioned Way of Making Repairs by Hand Broken Stone in Road Without Rolling

No question can be satisfactorily and permanently settled unless the settlement is, as far as possible, fair and just to all. In considering the subject of good roads we must not forget that we have over 1,500 miles of road in the county and that only about one tenth of that—the most used tenth of course—can be permanently improved even with the bond issue. So, a most important feature of the problem as a whole is the care of our dirt roads most of which we must have with us for many years to come. For certainly nine, if not ten months, of the year our dirt roads with a reasonable amount of sensible work would be good and much pleasanter to travel over than macadam. The main thing as I see it is to keep them mended. It is the old story of a stitch in time. Every one of us has seen some of our finest roads costing thousands of dollars go to rack and ruin merely for the lack of a little work in the right spot at the right time opening a choked drain here, stopping a beginning wash there, etc. We also are familiar with the fact that on every road there are a few specially bad places. For the most part we travel along with ease and comfort but presently we strike a short piece that is water-logged, perhaps, or with holes deep enough to hide a mule in, and then comes the tug of war. This bad place decides the amount of load we can haul and represents the actual

efficiency of the road. If we could only get the road management, whatever for it may take, to keep the holes filled up, the ditches kept open, the wet spots drained, the loose stones removed and an eight foot strip of sand or gravel laid on the centre of the worst clayspots we would have very fair roads that would answer very well. This to my mind is so plain that a blind man ought to see it and yet we have never been able to get it done. Why, I have never been able to understand. If this policy were pursued not only would the roads be better but nearly every man would see work done on his road, realize that he was deriving immediate benefit from his road tax and be better satisfied.

If the people of the county will authorize the bond issue of \$300,000 Raleigh township alone will take care of them, paying both interest and principal, and will build and keep up good macadam roads twelve to fifteen miles out in every direction. Then all the road

money derived from the other townships would be spent on their roads in proportion to the amount of tax paid as near as can be. As practically all the people come to Raleigh, everybody would have the benefit of the stone roads and at the same time such a distribution of the road tax would be just and fair.

My friends, we must all pull together and do something. This is the era of good roads. Many of our sister counties are far ahead of us and it is a shame for this great metropolitan county of ours to be lagging the race. Instead of "tagging along" far down the line we should be marching at the head of the procession. We can do it without increasing the burden of taxation one particle. We must do it. And the best way to do it, in order that our efforts may be concentrated and effective, is to organize the Wake County Good Roads Association for which special purpose we are met together.

Good Roads Notes Gathered Here and There

Colorado.

A good roads conference, called by Governor Shafroth, met in Denver, Col., January 13-14 and outlined plans for a big good roads campaign, asking for state aid in several road projects and discussing the many different phases of good roads work.

Chief among the roads for which state aid has been asked is the great circle road, which, when completed, will open up almost 1,000 miles of the finest scenic road in the world, and will be a great aid in bringing automobile tourists to Colorado. The various counties through which this road would pass are ready to do their part in the construction of the highway if the state will come to their help. The road would extend south from Denver to Pueblo, thence to Alamosa, to Silverton, to Montrose, to Grand Junction, to Glenwood Springs, to Leadville, to Colorado Springs, and back to Denver.

The convention asked that the legislature at its coming session appropriate at least \$500,000 to be spent on state highways under the direction of the state highway commission. This, together with one million dollars which the counties desiring to avail themselves of this fund, must put up would give a fund amounting to \$1,500,000 for good roads to be expended under the direction of the state highway commission.

* * *

Kansas.

Kansas has just held its first state good roads convention. This does not mean that Kansas is not interested in road improvement, for there is widespread interest in that state in it, but there has been no general movement for good roads. The convention was held at Wichita and was well attended. Kansas has been experimenting in building roads rapidly, after the Iowa plan, and at Coffeyville pulled off a bit of road building that made a considerable section of the country sit up and take notice.

A few weeks ago, 1,500 men, with teams and road-making machinery, built a modern wagon highway between Coffeyville and Independence, twenty miles distant. This was done between the hours of 7 in the morning and sundown. With the exception of oiling, the road is finished.

When the Montgomery County Good Roads Association was organized some time ago by landowners and

business men of Coffeyville, Independence, and Cherryville, it was declared that a thoroughfare should be built to connect the adjoining towns. Landowners and motorists contributed liberally to the work. To supervise the building of the roads, district superintendents were appointed. The preliminary work was complete before the start was made. Stone and concrete culverts, with clay pipe drains had been put in.

It is planned to improve every main road in the county. The road lately completed will be dragged during the winter. It will be oiled in the spring. Oil companies of the section have made a donation of the crude petroleum.

* * *

North Carolina.

North Carolina has never attempted spectacular road-building feats. The state has been content to go forward along the ordinary, conventional lines and a great deal of good has been accomplished. A project savoring of the spectacular, however, has been started recently by Hon. James H. Pou, one of the leading lawyers of the state of North Carolina, and has for its object the completion of a great highway across the state of North Carolina from the mountains to the sea to be known as the Central Highway. The proposed method of construction is as follows:

1. The State Highway Commission will designate roads through the various counties, extending from Beaufort Harbor, through the center of the state, through Asheville to the Tennessee line. This commission, not being local in its character, would not be confronted and embarrassed with local rivalries; but will select roads and make of them a continuous highway, running practically through the center of the state. The present roads will be used as far as practicable; and in most cases will be sufficient with a very little work.

2. Use the present county road force where it exists and use the convict and hired force in putting that part of the road in those counties in good order.

3. Have the legislature authorize the county commissioners of each county to appropriate, not exceeding fifty dollars per mile for the road in each county, said appropriation to come from the general funds.

4. Secure private contributions from public spirited citizens, automobiles, garages, etc., and by gift of road material from paving companies.

5. By setting apart one day next spring and inviting all public spirited citizens, who live within five miles of the road, to contribute labor, material or teams and in one day construct the road.

The legislature is in session now and a large number of road bills are on the calendar of house and senate. A great many counties and townships are contemplating bond issues and will be granted the privilege of holding elections. A model highway commission bill has been formed and will be presented to the legislature and there is every prospect of its becoming a law.

* * *

Ohio.

The Buckeye state has better roads than the majority of her sister states, but road builders of that commonwealth recognize the fact that her road laws are not up-to-date and have started a movement to improve them. At a recent gathering in that state, State Highway Commissioner J. C. Woodson, explained the law recently drafted, which he will, in a short time submit to Governor Harmon. The bill has been drafted by the highway commissioner and former Attorney General U. G. Denman for the purpose of replacing the 20 odd road laws which for many years have made legal procedure in road building more or less confusing.

Simplification of procedure is the keynote of the new bill. It clothes the county commissioners with more power in road construction and repairs than they have had heretofore. Provision is made for a superintendent of roads in each township, who shall be elected, and paid at the rate of from \$3 to \$5 per day.

The bill also names the county surveyor as county superintendent of roads, and for performing the duties of this office he shall receive \$300 annually in addition to his salary as county surveyor. The whole system would be under the direction of the state highway commissioner.

The most radical departure from the present laws governing road improvements is that the commissioners are empowered to initiate road improvements without a majority of petitioners, which it is believed will result in many highways being improved that could not be improved under the old laws.

* * *

Pennsylvania.

The automobileists of the country have done good work for the cause of good roads and in no state have they accomplished more than in the Quaker state. There is every reason to believe that the work of the Pennsylvania Motor Federation in securing at least a foundation for a series of main highways for Pennsylvania which will connect the leading cities and towns of the state will be successful. Careful plans have been laid looking toward that end.

During the two years that have passed since the last meeting of the legislature, the Pennsylvania Motor Federation has been agitating the subject till now it is familiar to everyone interested in road improvement from one end of the state to the other.

The legislature is now in session at Harrisburg and it is pleasing to note that a majority of the members have early placed themselves on record as favoring good roads legislation. The various organizations devoted to the good roads movement will endeavor to secure early action on several measures calculated to make radical improvements in the present road system in this state as well as to encourage and even compel the supervisors to repair and maintain the highways under their charge in a more economical and modern manner.

It is possible that this session's legislative appropriation will be made with restrictions requiring its expenditure on main cross-state highways, and a demand will be made that construction methods be radically changed.

* * *

Tennessee.

The Tennessee State Highway Commission has submitted to the legislature an extensive plan for a highway system. Its suggestions embrace the recommendation of a total expenditure of \$7,200,000 for roads. This amount would be divided, one-third for state highways, one-third for inter-county roads and one-third for county roads. It is proposed to build a total of 826 miles of state highways as follows:

Main highway, Memphis to Bristol, 500 miles; Memphis to Mississippi line, 12 miles; Jackson to Kentucky line, north, 62 miles; Columbia to Alabama line, south, 55 miles; Nashville to Kentucky line, west, 60 miles; Nashville to Kentucky line, north, 50 miles; McMinnville to Chattanooga, 60 miles; Chattanooga to Georgia line, 7 miles; Greenville to North Carolina line, 20 miles.

Governor Patterson is strongly in favor of state highways and Gov.-elect Hooper recently has suggested the building of a road from Memphis to Bristol



Florence, Ala. Good Roads vs Bad Roads. Roads to the West of the County Generally Good; Roads to the East of the County Generally Bad. Note the Effect on the Size of the Loads

in one day, after the manner in which citizens of Iowa built a cross-state highway.

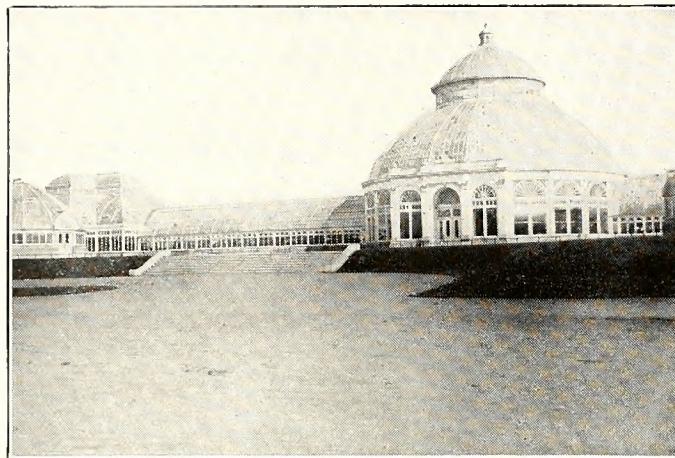
Commenting on the road activity in Tennessee and the more or less spectacular projects on foot, The Louisville (Ky.) Courier Journal says:

"That sort of a thoroughfare may be desirable, and if Tennessee sees proper to engage in building cross-state roads, no one outside of Tennessee will have cause to complain. The improvement of important county roads, however, is more necessary and is likely to be more beneficial than efforts along spectacular lines. If the county roads are improved on a uniform plan, and this can very well be accomplished where the building is done under state supervision, the state-wide highway eventually would come as a matter of consequence."

"The county and inter-county roads should be improved first. The boulevards can be built afterward. Every county which undertakes to build good roads should first look after its principal thoroughfares. When these are improved the less important roads and the branch lines can be constructed in whatever order is most desirable. State supervision should guarantee uniformity in work and methods so far as possible."

Virginia.

In the Old Dominion popular interest in road building has reached the acute stage in more than half of the counties of the state and the remainder of the counties are waking up. The most important road project being agitated just now is the Richmond-to-the-sea highway, an 88-mile stretch of road that is now practically assured. On Tuesday, January 24, seventy-five delegates, representing Norfolk, Newport News, Williamsburg, Richmond and all of the peninsular counties of Tidewater Virginia, met at the call of the Norfolk Chamber of Commerce at Williamsburg. The Richmond-Dispatch tells of the meeting in its editorial columns, as follows:



Botanical Garden; Bronx, N. Y. Drives Treated With Standard Oil Company's Standard Emulsifying Road Oil

The meeting was enthusiastic and unanimous and the road will be built. It will be 88 miles long. Twenty-eight miles of the road have already been built and are in excellent condition. The remaining 60 miles will now be constructed at a cost of only \$15,000, or \$250 the mile, road-builder Manville, who has been engaged in this sort of work since he was ten years of age, having undertaken to finish the job at that very low price. The road will be built of sand and clay. It will be thirty feet wide, will be thoroughly graded and well surfaced the entire distance and as smooth as a floor from Richmond to its terminus by the sea.

It will run from Richmond to Williamsburg and thence to Jamestown, Yorktown, Newport News, Phoebe, Hampton, Old Point and Norfolk. It will make the journey from Richmond to Norfolk by automobile easy of accomplishment in an hour and a half.

This highway will be one of the most picturesque and historic roads in the country, as it will run through a country of surpassing loveliness, and will connect the four great capitals of Virginia of colonial and post colonial periods—Richmond with Williamsburg and Williamsburg with Yorktown and Yorktown with Jamestown, and tourists and home people will see along this historic way the places at which American liberty was cradled amidst the most stirring scenes in the life and growth of the nation.

A State Highway Commission.

To the current issue of Southern Good Roads, published at Lexington, N. C., Mr. S. W. McCallie, state geologist for Georgia, has contributed a trenchant and timely article on the importance of a state highway commission. He deals specifically with Georgia, so that what he has to say will be of peculiar and local interest to every county in this commonwealth.

As the system is now operated, he says, in part, the state does not actually work its convicts on its public roads, neither does it have anything whatever to say as to the class of roads to be constructed, nor the manner in which the improved roads are to be distributed and maintained. The state acts merely as a distributing agent, a disciplinarian, a caretaker of the convicts.

Too much credit cannot be given the individual counties of George for the zeal and intelligence with which they are now grappling with the roadway problem. But it is evident that we shall never obtain a full and rounded measure of success until there is some central state direction applied to these diverse efforts.

A road means most when it is part of a system. Indeed, it means little until it is such. The people of one county cannot enjoy the benefits accruing from good highways unless their neighbors in the adjoining county have worked with them harmoniously and in accordance with a well-thought-out design. This important end must be realized through statewide supervision. We need just now most of all uniformity of purpose and method in the building of roads. The state alone can satisfactorily meet such a requirement.—Atlanta Journal.

BRIDGES AND CULVERTS

New Hanover and Pender counties, North Carolina, are going to build a concrete bridge across Northeast river which will cost \$30,000.

Muskogee county, Okla., is preparing to build a bridge across the Arkansas river at a cost of \$59,000.

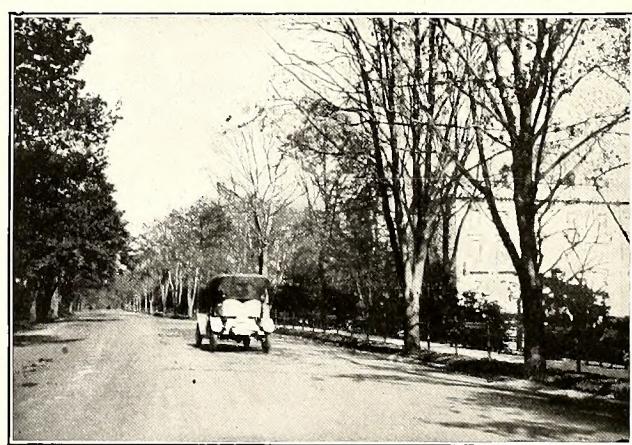
Wagoner county, Okla., is to build a concrete bridge across Verdigris river at a cost of \$14,000.

Greenville county, S. C., will build a wooden bridge over North Saluda river.

Shelby county, Tenn., is asking for bids on concrete culverts on Woodstock and Cuba roads two miles from Woodstock. The county is also asking for bids for the building of concrete supports under the big double steel bridges in Memphis over Cypress creek.

Austin, Tex., will build a concrete culvert over Shoal creek in the outskirts of that city.

At Cuero, Tex., a steel bridge with a span of 200 feet, will be built across Guadalupe river. It will cost \$25,000.



East Drive, Central Park, New York City, Treated with Road Oil

Dallas county, Tex., is to spend \$41,000 to build bridges over Trinity river.

Hano county, Tex., has voted bonds for the building of two bridges across Colorado river, between Hano and Burnet counties.

Kansas City, Mo., is to build a reinforced concrete arch bridge over Blue river.

Dallas county, Tex., is advertising for bids for a 70-foot steel bridge with 16-foot roadway and 10-ton capacity.

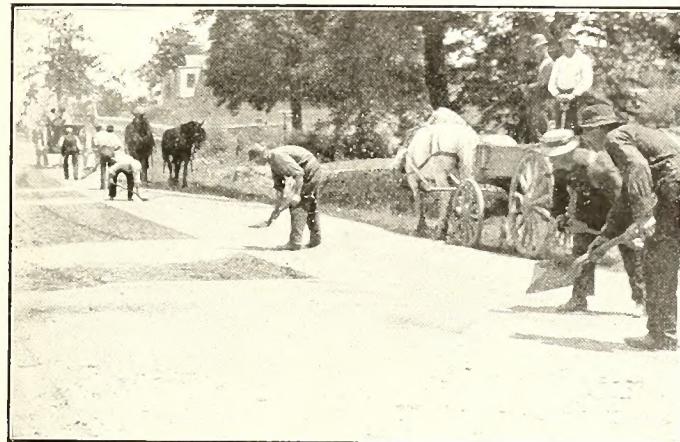
Spotsylvania county, Va., is planning to build several bridges, either of steel or concrete, within the near future.

A \$60,000 steel bridge is to be built to connect Columbus, Ga., with West Columbus.

Houston, Tex., has voted \$500,000 of bonds for the construction of concrete viaduct across the bayou at the foot of Main street.

The railroads and the city at Texarkana, Tex., have agreed on plans for a concrete viaduct to cost \$100,000.

Scott county, Va., will build steel bridge 192 feet long over the North Fork of Holston river.



Spreading Screenings on Road After Oiling—Prevents Tracking and Gives a Firm, Well Bound Surface

Hillsboro, Texas, has been asking for bids for 32,000 square yards of paving and about 13,000 linear feet of improved sidewalks.

The Good Roads Committee of Joplin, Mo., will build a model stretch of macadam road.

Mexia, Tex., will undertake additional street improvement to the amount of \$20,000.

Oklahoma city, Okla., will pave several streets with asphalt.

Tuscaloosa, Ala., is asking for bids for the construction of 19,000 square yards of brick, wood block, sheet asphalt or bitulithic pavement.

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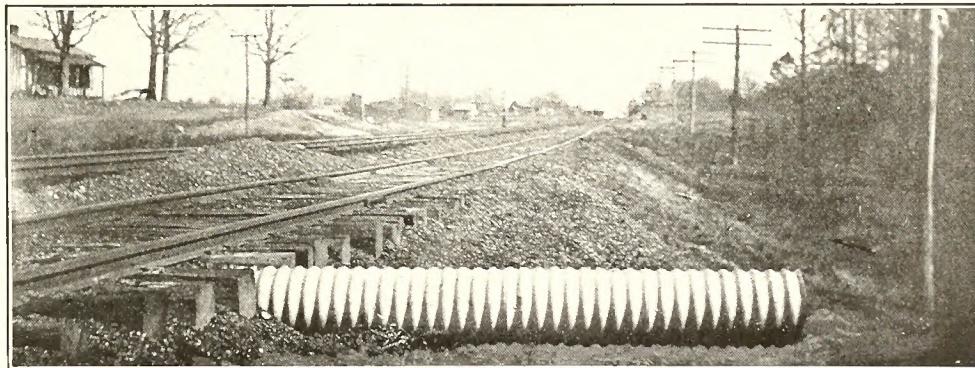
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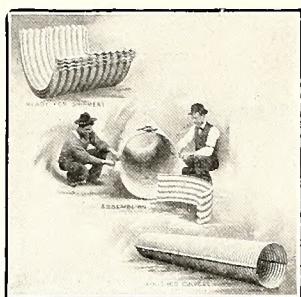
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They're Good Enough for the U. S. Government

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The fact that the United States and a dozen other governments use "Aemes" should convince you of their superiority.

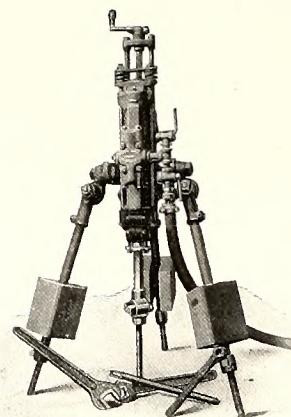
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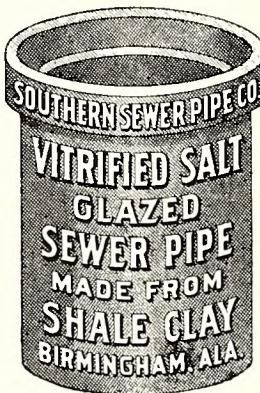
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SOUTHERN GOOD ROADS

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The Betterment of Our Highways

By PROF. N. S. SHALER, of Harvard University, with Introduction by DR. JOSEPH HYDE PRATT, State Geologist

There appeared in the Atlantic Monthly of October 1892 an article entitled "The Betterment of our Highways." This article by Prof. N. S. Shaler, although written twenty years ago, is just as applicable to the good roads problem as it exists in Southern Appalachian states to-day as to the New England states, regarding which it was specially written. Professor Shaler in this article is describing conditions and methods that are now in force in many sections of the southern states, and the remedies suggested by him should be given serious consideration. Prof. Shaler, who was a man



of deep learning, wide experience, and versatile mentality, and whose writings cover a wide range in the fields of history, philosophy, and natural history, was also very much interested in the subject of public roads, and devoted considerable thought and study to this question. He has written many articles and several books on subjects pertinent to road construction, and it has been thought that this article was well worth reprinting and using as good roads literature in the campaign for good roads that is being carried on throughout the south. This article of Professor Shaler will be of especial interest to the members of the Southern Appalachian Good Roads Association inasmuch as he was a native of Kentucky, one of the states comprising the Southern Appalachian Good Roads Association.

The following brief sketch of the life of this many-sided man may be of interest:

N. S. Shaler, naturalist, humanist, was born in New Port, Kentucky, in February 1821. His father was a prominent physician; he was a private pupil of Louis Agassiz, with whom he also served as a personal assistant; B. S. (L. S. S.) '62 Harvard; served two years in the union army as captain of a Kentucky Volunteer Battery of Artillery; in 1864 returned to Harvard as instructor in paleontology; S. B. (in Natural History) in 1865, and was given charge of the instruction of geology and zoology in the Lawrence Scientific School at Harvard; University lecturer, Harvard, 1868-72, and was in Europe much of the time during 1866-72 paying special attention to the study of glaciers and volcanoes. He climbed Vesuvius while in action, and was the first man to look into an active volcano. He was professor of paleontology at Harvard until 1888, when he was made professor of geology as well; directed the Kentucky Geological Survey, 1873-80; in 1884 he was put in charge of the Atlantic Division of the U. S. Geological Survey; in 1891 he was made dean of the Lawrence

Scientific School at Harvard. He died in 1906 as the result of an operation for appendicitis.

THE BETTERMENT OF OUR HIGHWAYS.

Perhaps the best of the many measures which may be applied to modern states, in order to determine the degree of advancement to which they have attained, may be found in the condition of their common roads. On the character of these ways intimately depends the ease with which a people secure neighborly communication, as well as advantageous relations to the outer world. It is doubtful, indeed, whether a sound democracy, depending as it does on close and constant interaction of the local life, can well be maintained in a country where the roadways put a heavy tax on human intercourse.

Judged by the standard of our local highways, America as a whole must be regarded as the least advanced of all countries which are commonly classed as civilized. It is true that our great transportation routes; those which are ploughed by the steamers of our inland waters and traversed by locomotives, are well organized, wide-spreading, and efficient in a high degree; but these ways serve in a direct manner only a narrow belt of country on either hand. They have a high interstate and international value, but little relation to the needs of local life. So far from meeting the necessities of rural neighborhoods; or aiding in their development, they have tended to retard the growth of the less conspicuous but really more important channels of communication, our common country roads.

A very strong argument could be made to support the point that the United States would have been in all essential regards more prosperous than it is at present if, in place of its railways, it had secured a system of highways constructed and maintained in the highest state of the road-maker's art. It is true that our great export industries would have been much less important than they are now. It is true also that a prosperity in manufacturing which has brought great bodies of our people to the Birmingham state of hived employment would not exist. Many of our cities would be but country towns, and the buffalo would still loan over much of the country to the west of the Mississippi. On the other hand, our farmers would know more of one another than they do at present. Though they could not market their corn in Liverpool, they would still be able to take it to mill without the sore tax which the bad roads so generally levy upon them, or which the toll-taker requires as the price of a passable way. In such a well-united community, distance counts for little against the duties of life, or against those pleasures which are in the higher sense a part of human obliga-

tion. The farmers could attend their town meetings, if they were so fortunate as to live in a part of the world which is governed by local parliaments. They could do their duty by their churches, and have a share in the festivities which enliven and enlarge their days. On the contrary, where the roads are bad, all the duties of the citizen and the social being are most imperfectly done. The people get in the habit of a hermit life; the winter season, which should be the time of social intercourse, is passed in seclusion; households have but little touch with one another, and any real communal life becomes impossible.

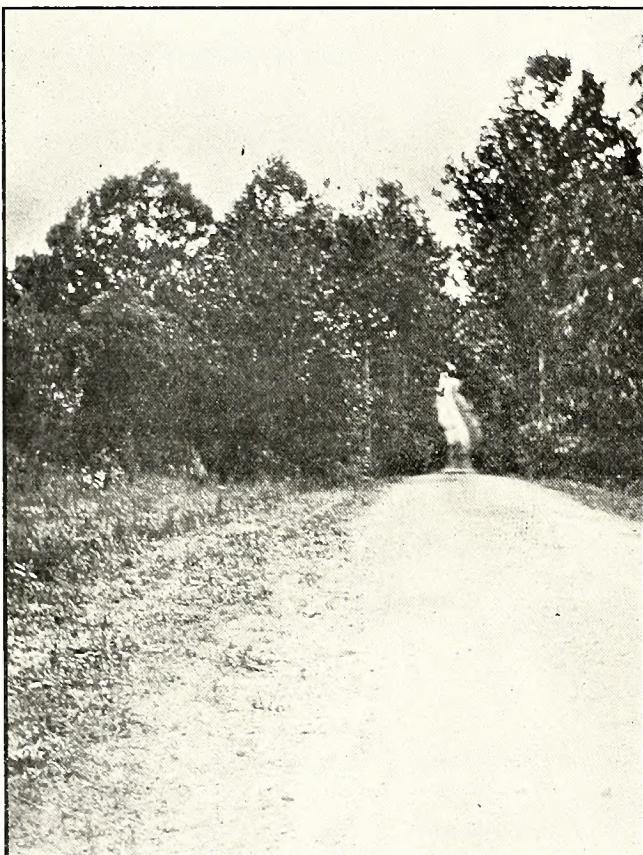
The period of railway construction began in this country when the attention of the people had just been effectively directed to the construction of highways. In the years between about 1820 and 1840 all the thickly

cross-road, and the people have had a quarter of a century or more in which to experience the evils of bad roads, we find our folk once again turning to this ancient question as to the means of local intercommunication.

The sudden access of interest in the construction of highways which characterizes our time is in good part due to the invention of the bicycle. The wheel carriage propelled by foot power is a relatively old contrivance, but until the last quarter of a century the machine adhered to the old type of the four-wheeled vehicle. It required the hearty spirit of our time to lead the inventor to the conjecture that a man might ride on but two wheels. In its social importance the bicycle deserves to rank next to the railway and the telegraph, among the inventions of our waning century. The use of these instruments, the number of which is probably now to be reckoned by the million, affords to those who employ them constant object lessons as to the condition of our highways. Where a man is drawn by a horse, he needs to have a very keen sympathy with his beast in order to perceive how apparently slight differences in the condition of the roadway may greatly vary the amount of strain which is put upon the propelling agent. When, however, his own thwigs are employed, every little accident of the way makes a distinct impress on his body. Thus every cyclist becomes a critic of the highways he traverses; and as these people are scattered far and wide over the land, and are of a station to make themselves efficient developers of public opinion, we have through their art gained a very stimulating influence in favor of better roads.

It may seem at first sight as if public interest in better highways would of itself be sufficient to insure all needed improvements in these means of communication. Those, however, who have studied the development of the roadmaker's art, in this and other countries, clearly see that public opinion must be well informed before there will be any chance of securing the end in view. We have to face a situation in which ancient habits and ignorances will greatly obstruct the process of reform. We cannot expect to clear away evils which for a thousand years have been borne in dull content, or to revolutionize bad practices of construction which are rooted in the customs of the people. Above all, it will be difficult to persuade our rural people to provide themselves with systems of highways the cost of which at the outset will be far greater than that of all the existing public improvements in their respective communities. Those who enter on this work must expect to hasten slowly, and to encounter many setbacks in their undertaking. Their task is to educate as well as to inform. They have to teach by example rather than by precept, and the examples cost a deal of money.

It seems worth while for all intelligent people to have some general notion concerning the simpler facts involved in the science and art of road-making. With such persons the study of these matters may well begin with certain fundamental conceptions as to the essential relation of these constructions. All highways are intended to afford a hard, smooth, and as nearly as possible horizontal surface over which that great instrument of civilization, the wheel, with its burden, can be made to move with the least possible friction. Every unit of friction which is encountered is a measurable element of cost, either in time, power, or damage to the road and carriage. For every foot of distance he traverses the wagoner is incurring a tax. If he is conveying the weight of a ton to market, the amount of this tax for a mile may, under favorable conditions, not exceed five cents. From this minimum



A Typical Indiana Road

settled portions of our land had acquired the habit of improving these lines of communication. From the local market towns good roads were carried on radiating lines, so that many communities of the older sort, even as far west as western Kentucky, had made great advance in their highway systems. Though not well planned with reference to the surface over which they passed, or built with the skill which now characterizes the highway art, these roads were of great and rapidly increasing utility. With the use of the railway in this country there came a great change in the ideals and the practices of our people. They began to look forward to the construction of iron ways as the means whereby they might insure connection with the outer world. It seemed to them not to be worth while to give time and money to the making of old-fashioned carriage-paths, which indeed appeared contemptible as compared with the new-fashioned means of travel. Now, however, that it has become plain that railways cannot profitably be arranged so as to reach every hamlet and

scale of expenditure, with the advancing degredation of the way, the cost may increase until it amounts to ten or twenty times what it is in the ideal though seldom realized state of a highway. At a certain stage in the accumulation of the tax, even the more adventurous, wisely, though without clear reckoning, regard the way as economically impassable. This conception of a roadway tax, and a clear idea as to the frequent enormity of the imposition, are the fundamental notions which we need to fix in the minds of our people. With these well affirmed, we may hope to interest them in the question of betterment.

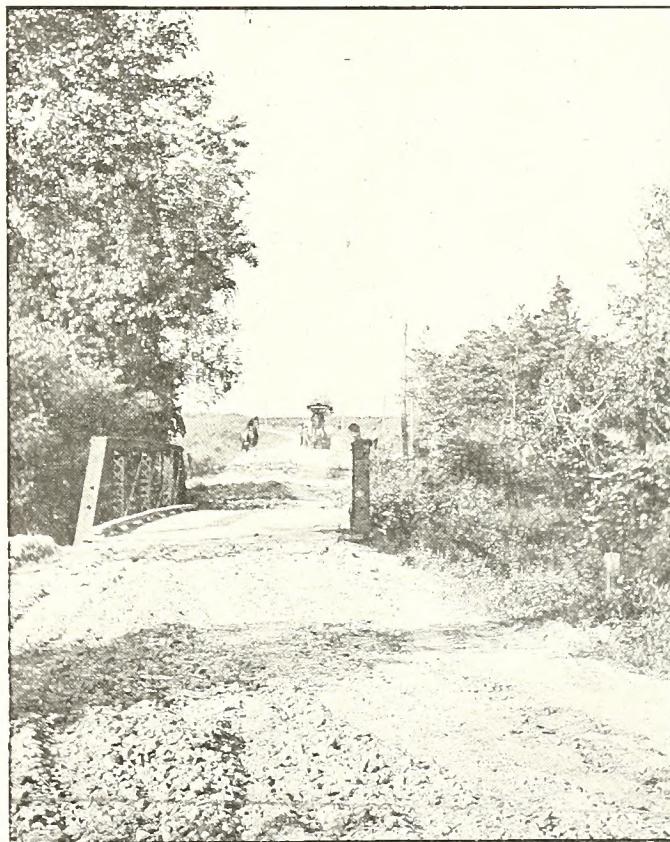
As in most other matters, the details connected with the construction and use of roads are much harder to present than the general considerations of the subject. There are, however, certain simple considerations which will enable anyone to know the essential differences between sound and unsound practice in the construction of highways. The first and most important, though in all countries the most neglected, element of care concerns what engineers call the profile of the way; that is, the irregular line described by its centre across the country. The ordinary road-master is in all cases tempted to draw his proposed line as directly as possible between his principal objective points. If he makes a digression from a rectilinear path, it is generally because he has encountered an insuperable obstacle, or because some land owner has effectively objected to having his fields cut in twain. Thus it comes about that the greater part of our roads are, from their unnecessary up hill and down, sorely taxing to the community which they are supposed to serve. In many parts of New England and the other hilly portions of this country, a wagon usually has to climb an aggregate height of a thousand or more feet in going a distance of ten miles, an amount of grade which could have readily been avoided by adding two or three miles to the length of the way.

In the rough reckoning of the country engineer, it always seems to be advantageous to construct a road on the most direct alignment which will be passable to loaded vehicles, with all the power which can conveniently be put upon them. It is easy, however, to show that usually the only economy which is thus effected is in the cost of the first construction. A close reckoning will always indicate that this initial economy is bought at a disproportionate annual cost in the expense of use and maintenance. The load which can be drawn over the direct way is often not more than half that which could be taken over the longer route, and the proportionate wear on the draught animals and the vehicle will often vary in a similar measure. Moreover, the expense of maintaining hilly roads, under the wearing action of rain, frost, and locked wheels, will more than counterbalance the cost of a longer but less inclined route.

Many persons, particularly those of small experience, are of the opinion that they carry in the mind a wide stretch of country so effectively that they may be able to design a route which will fit the topography in a satisfactory manner. This is clearly a delusion, as is shown by the fact that no trained engineer, however wide his experience, dares trust himself to stake out a mile of railway without a careful preliminary survey of the ground, one which will enable him to take to his office the data by which he can plat and compare the several possible routes. This care as to the location of a railway, though invariably taken, is, in proportion to the magnitude of the interests involved, of rather less consequence than that demanded in the case of a common road. The increase in the expenditure of energy required to convey the loads of ordinary wag-

ons up steep slopes is quite as great as it would be in the case of a locomotive climbing like grades, and the power which is applied through horseflesh costs far more per unit than that used in a locomotive. It is therefore clearly important to take the same kind of care in determining the route to be followed by a highway as is taken in the choice of a line for the newer kind of transportation.

The difficulty of securing proper engineering skill to determine the route to be followed by our ordinary roads arises in part from the fact that the greater portion of these lines, even in our little-settled districts, have already been fixed in a way which makes it almost impossible to correct their course; in part from the incompetence of our rural road-masters to do the kind of topographic work which is demanded of those who plan such constructions. Only slowly can we hope to correct the alignment of these ways. This task



Scene on Incomplete Macadam Road in Mecklenburg County with Substantial Bridge Across Stream

will have to be done in a piecemeal manner, and almost always the end will have to be attained against much opposition. In constructing new roads, much help will doubtless be had from the contour maps which the United States Geological Survey, in some cases with the aid of the several states, is now making. The more perfect of these charts delineate the surface of the country on the scale of one inch to the mile, and the heights are indicated by contour lines which show in a generally accurate way the form of the surface at intervals of twenty feet of elevation. So far, maps of this description of Massachusetts, Rhode Island, Connecticut, and New Jersey have been prepared, and work of a similar nature is now under way in most of the states of this country. With such maps, a discreet engineer, however limited his education, can plan the route of a highway, and determine with an approxi-

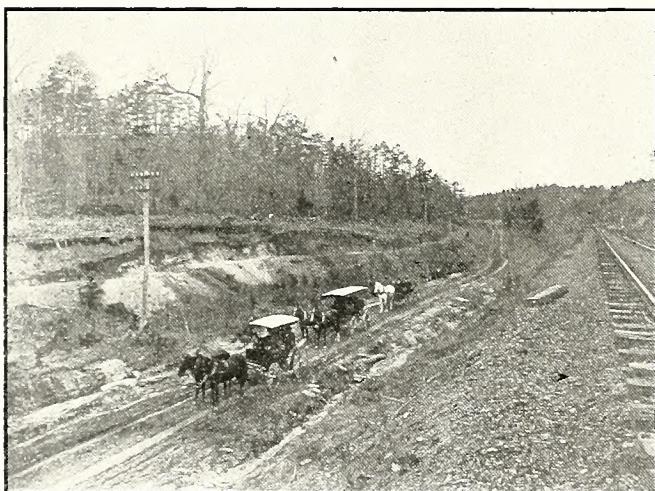
mation to accuracy the aggregate grade which will be encountered along the various lines which may be suggested. Though the results obtained by this method will be less satisfactory than they would be if based on an accurate map prepared for the particular end in view, they will be vastly better than if they had been won by the old method, where the surveyor worked his way across the country, planning the road with reference to the ground which was immediately within the scope of his vision.

Difficult as is the task which the surveyor has to meet in planning a highway, the work is relatively simple as compared with the more detailed part of his duties when he comes to determine the exact form and structure of the road-bed. These features have to be related to a much-entangled set of natural and artificial conditions. He must then take into account the general nature of the traffic for which the way is to be used, the quality of the underlying earth as regards its solidity and the effect of the water upon it, the penetration of frost and its effect, the dangers arising from the scouring action of rain, and the character of the materials to be used in building the traveled way. These considerations, though numerous, are indeed only a part of those which have to be borne in mind by the person who is responsible for the planning of such

two wagons conveniently to pass each other. In general, the paved portions of their ways, even those which were most frequented, did not exceed fourteen feet in width. These were, indeed, much narrower than those which are commonly found in our country districts. Our American ideas of largeness demand a road-bed from eighteen to twenty feet in width, bordered on either side by a waste of land forming a useless kind of common, and having an aggregate width of from twenty to eighty feet. This selvage of untried territory, which is often worse than worthless, because it becomes a nest and nursery of weeds, is frequently maintained beside our best constructed ways. The demand for this waste room beside the highway is due to a tradition founded in a time before any effort had been made to provide any artificial support in the way of a road-bed. In those olden days it was very convenient, and indeed often necessary, to turn aside from the ruts which had been cut axle-deep in the unprotected earth, to seek an untried field on either side. The loss of good arable land arising from the unnecessary width of the highway and its fringes often amounts to as much as four acres in area for the mile in length; and in some parts of the country more than one per cent of the tillage value of the region is thus, in obedience to an absurd tradition, deprived of all utility.

The nature of the traffic which is to go over a highway is an important element in determining both the width and character of the construction. The main point to be ascertained is the number, weight, and width of the carriages of all kinds which are to traverse the way. If the traffic is likely to be large the road will need greater width and more strength near its margins than where it is to serve the need of but few vehicles. The solitary driver may be trusted to take the middle of the way; horses, indeed, incline to do so of their own motion: thus the marginal wearing of the road will be limited to those points where vehicles pass each other, and the whole amount of such wearing will be inconsiderable. Where, however, the carriages are numerous, they often drive in parallel lines, the outer wheel of each column on the margin of the road-bed. Moreover, a considerable difference in the width of roads is required by the length of axles which are in use. Farm vehicles, in most parts of this country, are now tending towards shorter distance between the wheels than of old. There is, however, a great variety in this regard. Thus the light carriages in use in Barnstable and Duke counties, Massachusetts, have axles about eight inches longer than those which are found near Boston. Therefore a well-devised road from that city to any point on Cape Cod would properly be sixteen inches wider at its southern than at its northern end.

The weight which is carried on vehicles in well-paved cities is prevailingly very much greater than that which is borne upon the wagons in the open country, and this for the simple reason that the roads are better in the towns than in the rural parts. Yet in our country communities the amount of heavy traffic varies over a wide scale. Where the farming industry provides large amounts of heavy products, such as grain, cotton, or tobacco, materials of which the price is sufficiently great to permit of distant carriage to railway or river, the roads are sure to be taxed by very destructive wagons. On the other hand, where, as in New England, the principal marketed products are from the dairy or the market-garden, the average load upon the wagons may not be one-third as great as it would be if they carried the crops above mentioned. The discreet road-master will reckon for the maximum weight on four wheels which his roadway will have



Re-Location of Road Along Southern Railway
Henderson County, North Carolina

a work. Simple as the task of roadbuilding may seem to be, it is in fact more complicated than that which is encountered by the railway engineer. It demands something of the multifariousness of considerations required in the architect's art. In the construction of a highway say ten miles in length, designed to meet the needs of a rural community in a country of irregular surface, there are needed as much constructive knowledge and skill, and perhaps a larger grasp of complicated conditions than are demanded in planning a great building.

Perhaps the first question which the road-master has to consider is that concerning the width of the way he is to build. In this country, as well as in most of the states of Europe, the tendency is to make the road-bed a good deal wider than sound practice dictates. A part of the badness of our American roads is generally due to the fact that the trackway is far too wide to be effectively maintained. In this, as in many other of the grosser arts, we may well take a lesson from the ancient Romans, perhaps the earliest skillful roadmakers in the world. They invariably built their road-beds with no more width than was sufficient to permit

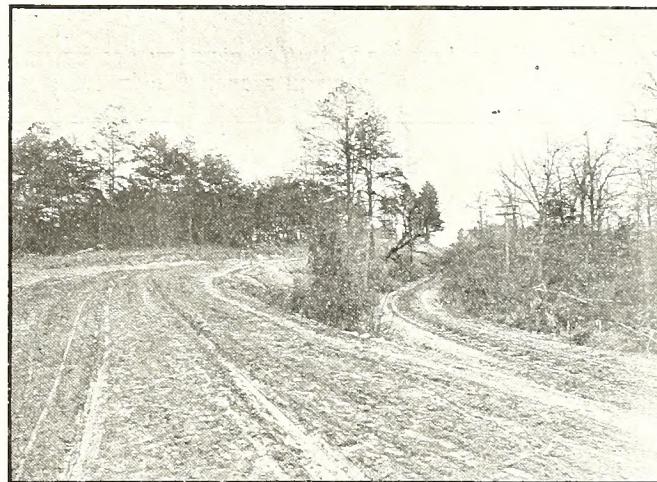
to sustain, and on that basis he will determine the required strength of the platform which he has to maintain.

A large part of the trouble with American roads arises from the absurd narrowness of the tire or bearing part of our wagon-wheels. It was probably from considerations of economy, in the days when iron was high-priced, that the American people, as if by common consent, adopted excessively narrow tires. If this unhappy fashion was due to this motive, it was certainly "penny wise and pound foolish" in a measure which is rarely to be found among rational people. Some argument may be made for the use of a narrow rim to a wheel where the road could have the hardness of granite blocks, but in our ordinary American conditions a wagon carrying the weight of a ton upon its bearing points must be regarded as an instrument of destruction. At the very best, a wagon wheel is a mill-stone with the road-bed for its grist, and the measure of the damage which it inflicts is, the weight being equal, inversely proportional to the width of the tire. We may see in the arasta of the Spanish miner or the common pugmilk of the brickmaker how effective is the continuous action of the wheel in grinding up rocky matter of varied hardness. The dust on common macadamized roads tells the story with equal clearness. But little of this waste comes from the horses' feet; the most is ground up by the wheels. On account of this destructive effect of the wheel, it is necessary to secure the smoothest and hardest surface which can be obtained for it to move over.

The ideal surface for the wheel is that which is obtained in the continuous steel bar of a well-constructed railway. The aim in the common road is as nearly as possible to approach the conditions which are afforded by such a track. Every irregularity of the surface on which the wheel bears, whether it be on the axle or the tire, is an element of cost, and is inevitably found in the bill for repairs, whether it comes on town or private account. A pebble in the road over which the wagon has to be lifted requires an expenditure of power in traction to win the height, and when the wheel falls it strikes the road like a trip-hammer, damaging road and wagon alike. In the present or any probable state of our road-making art, it appears impossible to give wagons the conditions of a metal tramway. We have to approach this ideal as best we may by making the tracks of some stony material found near the line of the road, and convertible, at small cost, into suitable foundations for the highway.

The accumulated experience of more than a century serves to show that only in rare cases can we find conditions where the materials of the soil or of the subsoil are fit for the construction of roads. The reason for this is simple. It is found in the fact that the processes which affect the earth's surface and produce the debris suited to the uses of plants tend to divide the rocky matter into more or less distinctly rounded bits which have soft outer surfaces. Whenever the shearing strain of a wheel is brought upon this detrimental matter, the particles generally move over each other, so that the greater part of the pulling force which is applied to the vehicle is expended in a kind of ploughing work, a task which is about as far removed from the legitimate business of traversing a way as can well be imagined. The best exemplification of this class of actions is found where a road is floored with gravel. We can there clearly see and hear the effects of the shearing action which the wheel produces on the materials, and from this example we more readily perceive that the first object of the road-maker is to keep the substances which form the bed firmly in place. In cities he may attain

this end by paving with blocks of stone or brick, or by covering his roads with a cemented material like asphalt. The Romans adhered to the principle of pavement composed of blocks, in all their important great ways. But these types of construction are impracticable in country districts on account of the great cost which they entail; and they are, moreover, damaging to the feet of horses when they are moving at a faster rate than a walk. Road engineers, therefore, have come to the conclusion that the staple or standard foundation for roads must consist of broken stone, the angular faces of the fragments so driven together that they will cling unmoved under any pressure which vehicles will bring upon them. Whatever be the variations on the theme, the plan of foundation made of angular bits of stone, and named "macadam," from the man who first brought it into extensive use, seems to be firmly fixed in our system of road construction. Upon this foundation of coarse material a superstructure for the contact



Sand Clay Road, Henderson County, North Carolina

with the wheel can be made in different ways, according to the needs and conditions to which the road-master has to adapt his work.

So great and so extreme are the variations in the conditions which limit the constructive work involved in road-making that this field of activity must ever be classed with the labors of the architect, and not with those of the mere builder. In time it will come to be perceived that the construction of highways demand a range of knowledge and a capacity for adapting means to ends which are required in but few of the branches of engineering. The range and scope of the problems are clearly greater than those which have to be dealt with by the railway engineer. If we take into account only the discretion which has to be exercised in the choice of road materials from among the various rock formations which the country near to the way may afford, we perceive at once how wide and full the knowledge of the road-master needs to be. Thus, in New England, it is rare indeed to find that a reasonably good choice has been made from the resources which the varied geology affords, and rarer still that the constructor wisely combines the substances which are at his disposition. To most of the men a rock is a rock, and even experience seldom tells them the difference in the value of the substances in road-making. With such men whims often take the place of knowledge, and the untutored man may amuse himself by efforts to mend a road with scraps of lathes, with much resulting damage to the feet of horses from the nails which this waste commonly contains; or he may satisfy his limited de-

sires for betterment by scraping the mud from the gutters into the eradle-holes which the wheels have formed in the trackway.

Properly to construct or repair a highway demands an intimate knowledge of the geology of the country which it traverses. If the under-structure of the earth, as is usual, varies much in the character, there is certain to be a great choice in the materials which may be made to serve in road-making. Some of these may prove, under the action of frost and rain, totally unserviceable, though their general aspect and momentary character may appear exactly suited to the end in view. Others, though soft on first exposure, rapidly become compact and enduring through a process of hardening which resembles that which takes place in good mortar. Here, as elsewhere in the road-maker's art, we find that he needs to be a naturalist, or, in other words, he must have a keen sense of the variety of conditions in the world about him. Although something of this sense may be born in men, we cannot trust to chance for discretion, but must seek to attain it by education.

Many of the worst roads in this country are brought into their abject state by an unreasonable interference



Taking to the New Trail—Road on the Isthmus of Panama

with natural processes—an interference which arises from an ignorant prepossession that all roads should have the same general aspect. Thus, in sandy regions, such as those in southeastern Massachusetts, and in many other districts near the southern margin of the area occupied by the ice during the last glacial period, the first wagon-roads belonged to the class which we may call track-ways, in which the path was just wide enough for a single vehicle, with occasional turn-outs to permit wagons to pass each other. On these track-ways a single pair of parallel ruts were quickly formed, the growth of bushes and low forest trees pressing so close to the road-way as to form a wall of foliage on either side. In many cases the crease made by the hubs of the wagons could be distinctly traced in the thick-set vegetation. Roads of this description afforded excellent wheeling, and were maintained almost without cost. The falling leaves and small branches were swept into the ruts, and there mingled with the sand, forming a compact and elastic foundation for the wheels. The sandy soil permitted the rainwater quickly to drain away, so that no gutters were required. Although an unreasoning desire for improvement has led to the widening of almost all these old-fashioned track-ways, we may here and there find bits of them which have escaped the merciless hand of the unedu-

cated road-master. The present writer is accustomed frequently to pass over a stretch of road which was originally all of this nature; but a part of it has been altered to the regulation width of forty feet, while another portion remains in its primitive state. On the improved road the constantly shifting sands are not readily to be passed over by a pair of swift horses drawing a light wagon at a greater rate than six miles an hour. On the more ancient and natural type of way it is easy to attain twice that speed. The horses themselves know the difference in the quality of the roads, and adjust their pace to the conditions.

The foregoing account of the road-maker's art, though a most incomplete sketch of its conditions, will serve to show the reader that this field of activity is not one which can be advantageously cultivated by ignorant men, whatever be their natural capacities, or the measure of their experience which they may have derived from a wise use of their blunders. This art demands a wide and well-founded training. It must rest, indeed, upon a good knowledge of several natural sciences. No amount of general determination to improve our conditions in this economic field will be fruitful unless we provide our communities with men who are well trained for the work which is to be done. Unless provision is at once made to educate road-masters, the present access of interest in this art will lead inevitably to a vast array of costly mistakes which will be likely to discourage our people, and to lead them to the conviction that their new estate is worse than the old. At present there are probably not fifty engineers in the United States who have been properly trained for the work of constructing highways. There may be several times this number who are more or less satisfactorily expert in constructing city streets; but that particular task, though difficult enough, is, as compared with that which the rural highway engineer has to take up, of a relatively simple nature. Few, if any, of our engineering schools pay any particular attention to this science and art. The question of common ways is treated incidentally, and with no emphasis at all commensurate with its importance. There is practically no effort made to develop specialists in this profession.

The first step towards our new dispensation is to persuade our greater schools to undertake the systematic education of road-masters, giving to the task the same care which they devote to the preparation of young men for railway or hydraulic engineering. There is reason to hope that the schools of this class which have generally shown admirable alacrity in responding to public demands will quickly meet this. The Lawrence Scientific School of Harvard University has already arranged for the services of an instructor in this department, who will devote all his teaching to matters connected with road construction. It is proposed to accumulate a sufficient collection of models and other apparatus to illustrate the teaching in the laboratory, while the manifold experiments in the methods of construction exhibited in eastern Massachusetts can be used as object lessons. If a dozen of our engineering schools in different parts of the country will provide similar systematic and continuous instruction, we may hope, in the course of four or five years, to graduate trained road-masters who are well informed in the science and art of their profession.

The next question for the reformer in the matter of road-building concerns the method by which the work of construction, improvement, and repair can be insured against the evils of ignorance. There is an old adage to the effect that it is one thing to lead a horse to water, and quite another to make him drink. Where

ancient manners and customs, however, bad, are to be modified, we must expect difficulty, and be prepared to move on the lines of least resistance. If we trust to the present desire to improve our roads under the existing methods of control, we cannot expect much amelioration. We must find some way in which well-informed authority can so direct the work as to assure a satisfactory result. It is obviously out of the question to look to the federal government for any considerable aid in this work. The geological survey is now providing, through its excellent topographical maps, something which may serve as a geographic foundation in planning the vast number of new roads which are to be constructed to meet the needs of our increasing population. To the same survey we may also turn for accurate studies and accounts of the road-materials of the country. It is evident that our state governments are the largest units of a legislative or administrative nature from which we can reasonably expect direct help. Even in these commonwealths, it may prove desirable to limit the action of the central authority to furnish information to the several counties or towns. Where, as in Massachusetts, and prevailingly in New England, the counties are large, it may prove advantageous to have a state board of road engineers, one of whom shall represent the commonwealth, and one for each of the several counties. These officers, sitting together, could adopt regulations adapted to the state as a whole, or to its several natural divisions; and in their own bailiwicks they could control the methods of construction adopted by the towns or other municipalities.

So strong is the noble motive of self-government, even in those communities which least recognize its exist-

ence, that we must expect a certain amount of resistance against even so much of an invasion into the ancient privileges of a people. If the condition of highways were a matter of importance only to the inhabitants of the town within whose limits they lie, the discreet reformer would hesitate to make this trespass; but such is the measure of interaction among our population that in many, if not in most cases, the highways of our municipalities of any grade are as much used by those who dwell without their borders as by their own inhabitants. Moreover, from a certain point of view we may fairly hold that the state has a right to protect its people so far as it can against the vile, discriminating taxation which bad highways inflict.

There is reason to hope that the advance in our methods of road construction will take place with exceeding rapidity, provided we guard the existing movement against the dangers of ignorant enthusiasm. As soon as, in any town, a few miles of good rural highway have been constructed, we may trust to the quick-witted nature of our people to extend the system. We see the same contagion of example, to which we may trust, in the ready imitation which is made in the edifices of our communities. It requires but a few years for good or evil in architecture to traverse a wide field. It is, therefore, the more clearly important that our first essays in the way of better roads should be undertaken as advisedly as possible, that they should represent the utmost which knowledge can do for us. If we but proceed in this way, we may fairly hope to avoid serious blunders with our innovations, and within the lifetime of a generation we may reckon on winning gains of great social as well as economic value.

Some Ideas in Modern Road Construction

By JOHN McNEAL, M. Am. Soc. C. E., City Engineer, Columbia, S. C.

It seems strange at this late date to say that road construction is in its infancy, especially when we remember that the subject of good roads was discussed by the ancient Romans as early as 312 years before Christ, when the Appian Way, a marvel for its straight course and solidity of construction, was built and has hardly been surpassed in modern times.

The fact remains however, that we are but beginning an era of road construction in this country, which is bound to have its effect upon the commercial interests of every community and reflect upon its civilization, as the roads of a community are said to be "accurate and certain tests of its civilization." As actual life is the school which tests the real character of a man and the schools in which the personal equation is the deciding factor, so the roads of this country in a measure are beginning to reflect through their very evolution the character of its citizens.

It has been my pleasure to observe the effect which street improvement, of a permanent nature, has had upon the growth of cities, and how rural districts have been developed by improved highways.

In the first case, the value of the property has invariably increased by a much larger ratio than the cost of the improvements imposed and in the second case, the districts have increased in population as well as development, owing to the reduction in cost of transportation.

The plan of assessing the cost of permanent street construction upon the adjoining owners of property in some cities has met with some opposition in its inception, but public opinion has as quickly changed, when

the benefits have been observed, and in many cases, the municipal authorities have not been able to keep pace with the demands of the property owners. It would seem that the initiative should come from the property owner and his demands would undoubtedly be met by a progressive municipality.

The cost of the development of suburban roads should naturally be defrayed by the county or state, as the benefit is not a personal one to the individual property owner, in the same sense that it is in growing cities.

The increased use of the automobile has had a serious effect upon macadam rural roads, as the speed of the tires has a tendency to ravel the material by sucking out the finer stone and dust which binds it together. This condition is more pronounced in the suburban roads than upon the city streets, as far as the deterioration of the road is concerned, but in either case the dust is objectionable.

Asphaltic oils have been found advantageous for the economical destruction of dust and the preservation of the surface of the road as well. They have been used for this purpose and with success where the conditions were ideal for the application, that is, road in first class shape, day hot and bright sunshine. In some cases one application of oil has lasted for five months.

Before applying the oil the road must be swept thoroughly clean of all loose material. The condition of the macadam regulates the amount of oil per square yard, but the maximum should not be over one-half gallon.

At the present time, the markets of the country are flooded with all sorts of asphaltic oils and tar mixtures,

of variable value, for road construction. The methods of construction are placed under two heads that of mixing and penetration. The mixing methods, although more expensive, seems to be the more successful, owing to the more uniform distribution of the binding material.

I have paved a number of streets with a patented process material prepared by the mixing method. This material consisted of mixing with crushed trap rock a bituminous or asphaltic mixture composed of pitch or the residuum of Texas Oil, fluxed with a lighter oil heated to a temperature of about 250 degrees and then applied to the stone in an asphalt mixer, so that the stone is thoroughly coated with a thin skin of the mixture. After the mixing is carried to a certain state, hydrate or oxide of lime is introduced, which combined with certain ingredients, tends to saponify the binder, making a sort of mineral soap, which is extremely tenacious and remains indefinitely more or less plastic. Through a certain chemical action the oxidation of the asphalt is prevented and the life of the material in-

creased.

It makes a water proof and resilient road and after about three months' wear, assumes the appearance somewhat of an asphalt or rather of a very smooth, hard macadam street, having the rubber like appearance of sheet asphalt. It seems to possess qualities of requisite durability, but has not yet stood the test of sufficient time to demonstrate its worth.

Experiments being carried out on similar lines are practically solving the problems of proper road construction. We are indebted in a sense to the automobile for creating the necessity for dustless roads. The successful road builders of today are the men from the ranks who have taken notice of experiments being constantly made. We have many theorists on this question, but no matter how well a road builder may be grounded in theory practical experience alone will add the finishing touch to his education. There is much to be done in this line and the scientifically trained practical road builders are the ones who are doing things and showing results.

Good Roads and Social Economics

By HON. EDWIN B. ROBERTSON, President South Carolina Automobile Association

I have been requested, as president-elect of the State Automobile Association of South Carolina, and on behalf of the automobile clubs affiliated to that association, to address this convention of the Good Roads Association of the State, and I have asked Mr. Hamby, secretary of the local chamber of commerce, to offer my apologies for not appearing in person. I have asked him to explain to you, on my part, that urgent business engagements, entered into previously to his request having been made upon me to address your convention, require my presence elsewhere.

I am so much interested, nevertheless, in the work of your association, and am so thoroughly appreciative of the vital relations existing between the condition of our roads and all phases of civic progress, the wealth, the health, the education and well-being of our people, that I have been constrained to contribute as best I can to the interest of this occasion by means of this paper which I am sending to Mr. Hamby, with the request that he will kindly read it to the convention.

I may add, in further justification of my interest in the matter, if, indeed, any be required, that, in addition to my connection with the state automobile association, I am also concerned about the work as a member and an officer of the Capital Highway Association, organized in this city in the autumn of 1909, for the purpose of promoting the construction of a highway from Washington southward through certain southern states, including South Carolina.

I cannot hope that I shall be able to add anything by what I shall say to your practical knowledge of road-building, and I shall not attempt to do so. My principal aim is to give expression to my interest in, and to make proclamation of my allegiance, so to speak, to the movement for which your association stands, and to say, if I may be so happy, some word that may stimulate a wider and deeper interest in the work.

In truth, if there is one thing in connection with the whole subject about which I am more profoundly convinced than another, it is that the practical work of road building is much too important to be lightly the-

orized about or entered upon in a haphazard manner. It is a sad truth that this haphazard and diffident manner just about represented our national attitude towards the road question until as recently as 1890, in which year the foundation of the National Good Roads Association was laid at a meeting in Kansas City.

Growing out of this movement a petition was presented to congress, in 1893, signed by the governors of many states, numerous local chambers of commerce, and other bodies, to the effect that a road department, similar to the department of agriculture, should be established in Washington. As the result of this and other efforts congress did, in the year 1893, establish the Office of Road Inquiry, attached to the Department of Agriculture. The purpose of that office was to make inquiries with regard to systems of road building and maintenance throughout the United States; to make investigations with regard to the best methods of road building; to train students as road engineers and experts; to issue publications and disseminate information upon the subject, etc.

It is a fact that very little real work was accomplished by the office up to the year 1905. Since then, however, through the efforts of a really competent director, of the office of public roads in Washington, the office has laid the foundations of a thoroughly scientific plan of road engineering and building, which will in time, through the gradual enlargement of its scope and the extension of its educational propaganda, do incalculable good to the entire country. We have seen the effects of this work in our own state; men are beginning to understand that road building and maintenance is not a mere matter of piling the debris from both sides into the middle of the road, and leaving the net result to the tender mercies of the elements. They are beginning to perceive that efficient road building is a complicated work, involving knowledge and consideration of drainage, local climatic conditions, the properties of different sorts of building materials, with regard not only to their cheapness and durability, but to their adaptability to the climate of the section in which they are to be used. These are elements about which our primitive road builders gave themselves lit-

tle concern, and we are paying for their ignorance. Aforetime, it must be acknowledged, in this matter of road making it was deemed perfectly proper that every man should be a law unto himself; that one man was as good a road maker as another; that road building was not a matter of great importance, any way, that it was largely a sentimental question, and that if a road started from some fixed geographical point and arrived, by whatever devions and difficult route, "up hill and down dale," at another established geographical point, all had been accomplished that was reasonable or necessary. The fact is, the majority of our roads were never made—they just grew, sprouting and luxuriating in every direction according to the whims and expediencies of the pasture-hunting cow and the plodding ox.

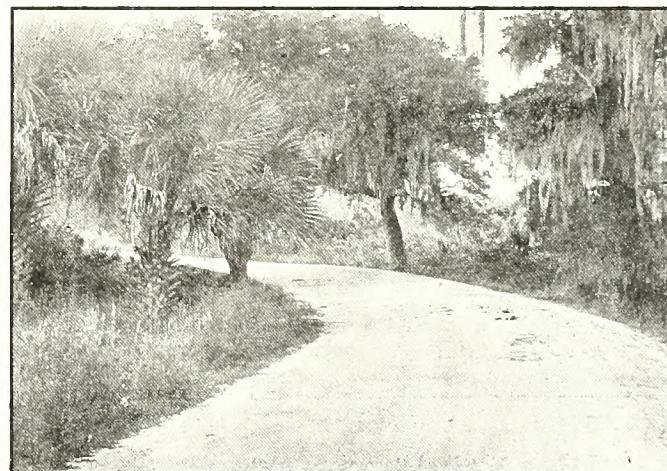
It is a point that you may or may not have thought out, but it is a grim and indemnable fact that the economic loss, and the cost, direct and indirect, to our entire country, through the prevalence of this attitude of indifference and this ignorance with regard to roads and road building and maintenance, represents many times the aggregate amount of all the millions that this nation has expended in all the wars in which it has ever been engaged. I shall endeavor, later on, to give you some figures that will illustrate this statement.

It is for the reasons suggested that I shall not attempt to offer you any suggestions relating to the practical work of building, repairing and maintaining roads. That is the legitimate sphere of the road expert, and the sooner our people generally come to that conclusion the more quickly we shall see the construction of permanent roads that will facilitate travel instead of effectually impeding it as some of our roads do now. We are growing into a nation of specialists; it was inevitable that we should have the road specialist eventually; the unfortunate part of it is that we have been so long developing specialists in a domain that is so closely and vitally related to our daily lives.

It is a trite common-place that Rome owed to her magnificent roads, as much as to her legions, her universal sway over the known world. After the fall of Rome road building for many ages became a lost art. But the Roman roads, built with scientific foresight and with a profound knowledge of road engineering, survive to this day as monuments of the greatness of her engineers, when the other material evidences of her supremacy are fallen into decay. The Romans built not for the day, theirs was no chance-medley of cow-paths and makeshifts, but vast and perfect system of highways, correlated each with the other, knitting all parts of the empire together, affording the means of transportation and travel in times of peace and war, stimulating trade and spreading the influences of Rome in every direction.

It has been said that Rome had such perfect roads because perforce, in the absence of other methods of travel, the Romans had to develop the only medium they possessed; and that with us the railways do what the old highways did for Rome. This is but half a truth, and by no means extenuates our neglect of road building. The railroads cannot penetrate everywhere; they constitute only a part of our system of transportation. The extent to which the public road is the necessary supplement to the railroad is not generally appreciated. Mr. Lyman Beecher Stowe, a prominent writer, says: "With us the public roads are to communities what the railroads are to the nation. The common roads act as feeders to the railroads. The prosperity of the railroads is to a large extent dependent upon the condition of the common roads." I should not insult your intelligence by reminding you

that the prosperity of the railroads is always a definite measure of the prosperity of the nation or state. We all know that this is an era, and an ever widening and developing one, of transportation. Into the price of every commodity, every article we wear and almost every morsel we eat, every book and periodical we read, into the necessities and the luxuries of life, the cost of transportation enters as an element. And this cost, and consequently the entire cost of living, about which we hear so much nowadays, is tremendously affected by the condition of our public roads. Mr. Stuyvesant Fish, when president of Illinois Central Railroad, said: "The cost of transportation does not begin at the railroad station, but at the farm. So far as the transportation companies are concerned, they have got about at the end of reduction in freight charges. Then where are we going to economize? It can be done, and it should be done, in the cost of transportation on the public roads of the country." Now, we may or may not agree with the proposition that railway rates should be maintained—we are not concerned with that question here; but there is no escape from the truth of the statement that total transportation costs are viciously affected by the poor condition of our public roads. It has been estimated by Mr. Stowe, whom I have already quoted,



Curve on La Roche Avenue, Savannah Auto Course
Treated with Indian Liquid Asphalt

that a minimum of 250,000,000 tons of freight are handled annually over our public roads to the railroad stations of the United States. I have no means of knowing how much of this total tonnage is handled in South Carolina, but we have our share of it. The average cost of hauling over the public roads in this country is about twenty-four cents per ton mile, and the average haul is about nine miles. The same author states that this transportation over our public roads to railroad stations represents an annual outlay of considerably over half a billion dollars. I do not know how accurate the figures are, but their very immensity must give us some idea as to the extent to which the cost of this road transportation affects us economically.

The office of public roads, to which I have alluded, has inventoried all the public roads of the United States, and calculates that their extent is 2,155,000 miles, "a length sufficient to circle the globe at the equator with eighty-six parallel roads." Of this total, five years ago, only about 7.14 per cent. was improved. The remainder was, so to speak, "in a state of nature."

As Mr. Stowe says, very forcibly, these 2,000,000 miles of unimproved roads (of which we in South Carolina have our fair proportion) are a heavy burden up-

on the unfortunate "ultimate consumer." Every pound of produce brought from the farm to the market bears an inflated price because of the excessive cost of transportation to the place of sale or trans-shipment. "For instance," he says, "it costs an average of almost two cents more to haul a bushel of wheat from the farm to the station, nine miles away, than it does to ship a bushel of wheat from New York to Liverpool, 3100 miles away. This excessive transportation cost must be made up by the farmer in charging more for his wheat, by the miller in charging more for the flour, by the baker in charging more for the bread, and, finally, of course, by the 'ultimate consumer' in paying more for his bread. As the farmer and the miller are also consumers, the excessive cost of road transportation really levies a tax upon all."

It has been always a sort of gospel for us to vaunt our superiority over other nations, particularly in economic and industrial matters; but we must confess, in this matter of road making, which, as we can see, really underlies our entire industrial fabric, the "effete nations of Europe" have us, in the language of a re-

pass, the standards of foreign countries. It is essential that we should remember that our roads should be built for permanence, and that when they have been so built they should be maintained. This is the work of years. The history of modern road building in France (and I take France for example because her roads are more generally excellent than any I know of) extends back to the middle of the seventeenth century. At about that period King Louis XIV constructed about fifteen thousand miles of hard roads. The present system of road maintenance in France, we are told, was established during the reign of the Emperor of Napoleon, who built the famous road over the Simplon Pass, which is still regarded as the greatest feat of road engineering in history. The French system is under supervision of an inspector-general of highways and bridges. Local inspectors report daily on every yard of public road throughout the country. They see to it that ditches are kept open, that holes and ruts are filled as soon as they appear, that earth and sand are removed after every rain-fall, and that the road surface is kept in essentially the same condition as when first laid.

This is the ideal towards which we should work. We shall probably not reach it soon, but we may, by united endeavors and by co-operation between the farmer, the merchant, the shipper, the automobilist and all classes of road users, approximate and year by year get nearer to it.

Now, gentlemen, I have spoken of the economic aspect of this question, which is important, and I have implied something of the social feature of it, which relates to the use of highways by automobiles. There is another phase of the question which is not less important. Fifty years ago Charles Sumner declared that "the two greatest forces for the advancement of civilization are the schoolmaster and good roads." Who can deny, if we think it over, that there is an intimate relation between good roads and education in our rural districts? I will refer again to the valued opinions of Mr. Stowe: "Other things besides dollars," he says, "are lost by bad roads. Other things besides dollars are gained by good roads. In every state there are native-born whites who can neither read nor write. In the four states where the average percentage of improved roads is 30.55, the proportion of white illiterates is only thirty-four hundredths of one per cent. In the four states where the percentage of improved roads is only 1.51, the proportion of native-born white illiterates to the total population is 4.76. In the first group of states, out of a population of over 6,000,000 only a little over 20,000 of the native-born whites are illiterate. In the second group of states, out of a population of considerably less than 8,000,000, almost 400,000 of the native-born whites are illiterate. The condition of the roads in this group of states is undoubtedly both a cause and an effect of the high rate of ignorance. While neither the sole cause nor the sole effect, the close relation between lack of decent roads and lack of decent education is obvious."

Representing chiefly the automobilists of the state, I should probably say something definite upon this subject from that standpoint. As a matter of fact the interest of the automobilist in the public roads is very considerable, but it is no greater than, if as great as, the interest of the farmer and shipper. I think the vogue of the automobile has been a wonderful stimulus to the work of road building and maintenance. It has been said, with truth, that the relation of the automobile to the public roads is anomalous; that while the automobile has promoted the extension and building of roads, it has also impaired existing roads to some extent; that while it has created an effective desire for better



Savannah Auto Course. Turn at South End, Near Bedlieu. This Course is Treated with Indian Liquid Asphalt.

cently submerged political prophet, "Beat to a frazzle." I have ridden over many miles of the roads of France and England, and this is a fact that I know from the evidence of my own eyes. In France, for instance, as against our average cost of twenty-four cents for road transportation, the average cost is said to be not more than twelve cents per ton per mile. On this basis the office of public roads has estimated, if our cost of road transportation per ton per mile were the same as the French cost, the saving to our shippers annually would amount to a quarter of a billion of dollars. In fact, Mr. Arthur C. Jackson, president of the National Good Roads Association, in 1909 estimated that in the United States "bad roads are directly responsible for the loss of over a billion dollars a year," and he said, truly enough, "that the saving of this stupendous sum constitutes an economic question of vast importance." Does any one question that it is worth our while, that it is urgent and necessary, here in South Carolina, for us to do what we can to save our share of this stupendous sum, in comparison with which the public debt of our state looks like a laundry bill?

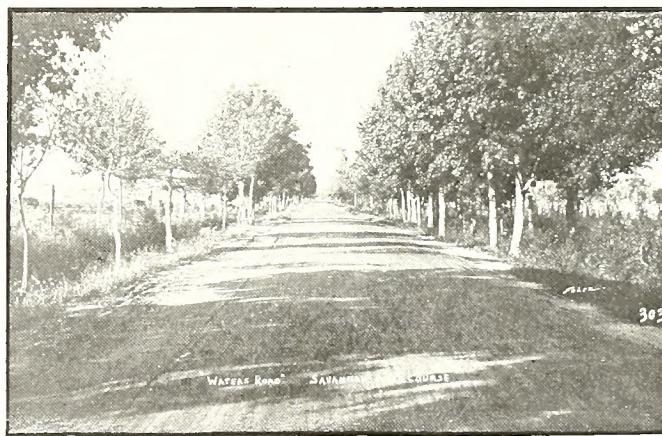
I believe that we are just awaking to the importance of road building and maintenance; there is much to be done, but we have started and I am optimistic enough to believe and to prophesy that we shall, in this as in other departments of life, attain to, if we do not sur-

roads, it has also created new problems in road construction. Properly regarded, however, this is not an unmitigated evil, for, while the automobile imposes upon ordinary roads a sort of wear and tear which they were not constructed to withstand permanently, this very factor has stimulated the inventive minds of the road engineers to devise methods to meet the new demands, and has led the road scientists of the world to undertake experiments the reasonably assured outcome of which will be the solution of the chief road problems of all time. So that, in the end, the automobile will be found to have created the demand for roads of more enduring and permanent character, and to have indicated the means by which this end can be reached. Dustless and dust-controlled roads, it has been pointed out, would add untold millions to the values of suburban and country property, would reduce by at least ninety per cent. the disease laden dust which the people are continually taking into their lungs and would greatly increase the beauty of vast stretches of country. The achievement of this is no day-dream. Towards it are being directed the united attention of the office of public roads, representing the federal government, the national association of the farmers of the United States, and the American Automobile Association, as well as the International Bureau of Roads established in Paris two years ago. And we here in South Carolina are not only entitled to take our place in and bear our share of the burden of the undertaking, but it is a duty laid upon us by our fealty to our state, as well as by self-interest. And in whatever can be done to advance the work, I am sure that I speak within bounds when I assure your association that you will receive the loyal support of the officers and members of the State Automobile Association and the Capital Highway Association, whom I have the honor to represent before you.

I had not purposed, at the outset of my remarks, to say anything with regard to legislation in this state concerning public roads, that subject being one which to enlarge upon or to consider adequately would consume too much time; but just as I had about reached the conclusion of what I set out to say, my attention was arrested by the newspaper report of a bill which has just been introduced in the legislature now in session, for the creation of a state highway department. I shall not comment at length upon this bill, but, from its general terms, as I understand them, it appears to be a step in the right direction. I notice that it provides, among other things, for the very sort of educational work in connection with public roads which I have advocated in this paper. It contemplates the employment of a skilled official, expert in the work of road building and maintenance, whose duties shall require him not only to bring his knowledge and the resources of his art to bear upon the business entrusted to him; but shall require him also to assist by his advice and suggestions the county road supervisors throughout the state, and to conduct educational campaigns on the subject by various means prescribed in the bill, which should be effectual.

Any measure which tends to establish a scheme for building and maintaining our roads in a systematic and orderly manner is commendable and worthy of our hearty endorsement and support. There is also a provision in the bill for an annual license fee of five dollars to be paid by each owner of an automobile, one-half to go to the state for the support of the office of the highway commissioner, the other half to the county in which the owner paying the license is resident. No objection could reasonably be urged by the owners of automobiles against the imposition of a proper license fee, especially where the revenues so raised are intended to be used

in highway work; but it appears to me that the plan would be made more effectual and satisfactory by a modification of this section of the bill, so that instead of a fixed and arbitrary license fee of five dollars on every automobile, without distinction between heavy and light cars, the license fees were based upon a minimum fee for the lightest cars, or the cars of least horse-power, ascending in a sliding scale which should correspond to the increasing horse-power of the larger cars. By such a method the owners of heavier and more powerful cars would have to pay larger license fees than the owners of smaller cars, which would be more equitable not only in view of the fact that the heavier cars subject the roads to more considerable wear, and should therefore pay more for their use; but because, further, as I consider that such license fees should be the only tax levied upon automobiles, the heavier cars represent greater taxable values. By this I do not wish it to be understood that I would favor any diminution of the amount of taxes now levied upon automobiles, but merely that the tax should be in a different form, namely, by means of the license fees, and that the taxes or fees thus collected upon automobiles, instead of being applied as now to general purposes, should be applied



"Waters Road," Savannah Auto Course

solely to the building and maintenance of the public roads. Finally, I would recommend that such a proportion of the license fees as might be deemed proper or sufficient should go into the treasury of the state to be applied to the expenses of the office of the highway commission and the balance arising from the licenses sold in each county should be turned into the treasury of such county to be applied solely and entirely to road work in that county. I think such a law would be regarded favorably by all automobile owners and I am convinced that its enactment would be a salutary thing for the highways of the state.

And now, gentlemen, I wish you God speed in your work, and whatever difficulties you may encounter I hope you will be sustained, as you should be, by the reflection that there is no greater, more patriotic or genuinely beneficial work going forward in this state, or anywhere else, than is this movement looking towards the improvement of our public roads.

It has been ascertained that the state road commission of Maryland has \$1,500,000 to spend on road work in 1911.

A contract has been let in one of the suburbs of San Antonio, Tex., for 1,000,000 feet of cement sidewalks.

Macadam Roads and Their Preservation

By HON. LOGAN WALLER PAGE, Director of Office of Public Roads, United States Department of Agriculture

The term "macadam," which is at present applied to all types of broken stone roads that have no paved foundations, is more or less of a misnomer. The macadam road of today is so different in methods of construction from those used by McAdam that his specifications are hardly recognizable.

The use of broken stone on roads is of unknown origin, and probably antedates history. The first written specifications for a broken stone road that I have been able to find are contained in a report by a French engineer named Tresauguet, in 1775, which preceded McAdam's and Telford's work by nearly forty years. Not only did Tresauguet give a number of specifications and cross-sections of different types of roads, but in the same report he outlined for the first time a plan for a continuous system of maintenance of broken stone road which is followed to a great extent by the French government today.



Montgomery Road, Savannah Auto Course

The principles involved in the proper construction of a modern broken stone road are, first that there shall be a suitable thickness of stone to give a rigid foundation, and, at the same time, that the sub-grade shall be so shaped and drained that no water can accumulate at the base of the road. The wearing surface constructed of smaller stones than those used for the foundation, and is usually cemented together by the screenings of the rock used in construction, or, when this is not sufficiently cemented, earth or clay is frequently used. This type of road, when properly built of suitable rock, and maintained, has withstood the wearing action of horse traffic in a most satisfactory manner. When the rock of which such a road is constructed is suited to the volume and character of traffic to which it is subjected, just enough fine dust is worn off by horse traffic to supply that removed by wind and rain, and, by this continuous action of cementing and recementing, a smooth, impervious wearing surface is retained.

The introduction of motor traffic, however, has completely upset these conditions. The pneumatic tire wears off no fine rock dust to cement the surface of the road, but, on the contrary, when traveling at high speed, it throws the dust derived from horse traffic into the air and quickly disintegrates the surface. The exact action of the pneumatic tire on the road surface is still a matter for investigation. We hear much of the vacuum, or suction, produced by this type of tire, the

shape of the car body, etc., and, undoubtedly, these factors have something to do with the lifting of the dust from the road and its dissemination. If the road, however, is properly constructed of suitable stone, there should be little or no superfluous dust, and the fault then lies not so much with the shape of the car body and the suction of the wheels as with the construction of the road. I have been conducting some experiments along this line during the last few years, and I am convinced that the greatest destruction to the road surface from the pneumatic tire comes from its shearing action.

In one series of tests, I had a high-speed car driven over a macadam road, which was in first-class condition, at speeds from ten miles an hour to sixty miles an hour, with regular increments of increase of ten miles an hour. The dust raised from the surface of the road by the driving wheels of the car increased directly with the speed of the car, while the dust from the front wheels showed practically no increase. I hope to show later a series of high-speed, right-angle photographs taken of this car at the different rates of speed, which I believe will illustrate this point. I had no dynamometer for testing the horse power of this car at the different rates of speed, but, as near as I could compute from the rating of the engines and the cross-sections of the car, at sixty miles an hour it exerted a shearing stress on the surface of the road of about 137 pounds per driving-wheel tire. When we have such a factor of destruction as this, it seems to me that any vacuum that could be formed by the wheels would be insignificant in its effect.

With this problem before us, and a rapidly increasing motor traffic, the highway engineers throughout the world are at present investigating every known material that gives the slightest promise of meeting the conditions that confront us. At present, the problem seems almost insurmountable, because materials that will withstand motor traffic are nearly all objectionable in many ways to horse traffic, and, with 2,155,000 miles of road in this country and an annual expenditure of about \$30 per mile per year, how are we to construct our roads for withstanding motor traffic, even if we do not consider horse traffic?

Preservation of Macadam Roads.

The preservation of macadam roads is undoubtedly the most important problem that at present confronts the road engineer, and one which has attracted more general attention on the part of road builders and road users than any other. The effect of modern traffic upon the road itself is coming to be more and more severe every day, and the problem is gradually resolving itself into the question of how to modify the ordinary type of macadam so as to produce a more permanent roadway. It is probable that the near future will present an even more serious phase of the problem, due to the use of heavy self-propelled busses and vans, which will exert a much greater shearing stress upon the road surface than the lighter motor cars, and, in addition, will subject the whole road, including the foundation, to strains which it was never designed to withstand. This condition of affairs has already made itself apparent in England where traction engines hauling trains loaded with merchandise to be distributed in the suburbs of large cities are coming into general use.

Disregarding this aspect of the problem for the time being, and considering it only as it is presented today,

in this country, we may briefly review the methods which have so far been employed to meet it, and, I believe, forecast the probable outcome of the whole matter in a general way.

As the primary cause of road destruction is due to the removal of the finer products of wear, the most promising method of solving the problem of road preservation seems at first thought to lie in the treatment of the road surface with some material which will prevent the displacement of the rock dust in the wearing surface. Water alone is known to serve this purpose to a certain extent by developing the cementing value of the rock dust, but its action is but temporary owing to its rapid evaporation. Applications of sea water which contain small quantities of hygroscopic salts produce perhaps a little more permanent effect, but result in an accumulation of inert sodium chloride in the road surface, which, for a number of reasons, is undesirable. Bittern, the mother liquor obtained from the evaporation of sea water in the manufacture of salt, being slightly richer in these hygroscopic compounds, is somewhat more efficient, but its use is quite limited, and will probably never prove satisfactory. Solutions of calcium chloride, which keep the road in a moist condition for a much longer time than water alone, have so far given more satisfaction than any other salt solutions, but even calcium chloride, which is one of the most hygroscopic salts known, requires an occasional feeding with water, unless the atmosphere is particularly humid. This means that it can never be used successfully on the majority of country roads, where no convenient supply of water is at hand.

Working along the line of dust retention by moistening, experiments were conducted in Algiers a few years ago with cheap vegetable oils which could be readily applied to the road. More permanent results were obtained than from the application of water, but the road surface was made so slippery that their use was abandoned. The same effect is produced by the application of mineral oils rich in paraffine and oil and tar distillates, which also act to some extent as lubricants, and, while holding the dust down, tend to destroy its binding qualities, and thus aid in the disintegration of the road surface. The lighter oils and oil emulsions containing a certain amount of true binding base have proved much more satisfactory where properly applied, as have also tars of suitable consistency. Their use has certainly been a step in the right direction, inasmuch as an actual binding medium has more lasting qualities than the simple rock-dust bond.

The same may be said of concentrated waste sulphite liquor from wood pulp mills, which produce an even more powerful bond, probably due to the tannic acid present, but which is somewhat less permanent in effect, owing to the tendency of rains to dissolve and remove the binding base from the road.

It is not within the scope of this paper to consider all of these materials in detail, but merely to mention typical examples with relation to the part they now play and will continue to play in the solution of the problem of macadam road preservation. When employed in the surface treatment of roads, the best of them will prove effective for only a comparatively short time, owing to the fact that, as the road surface wears down, they are rapidly removed or their binding value becomes inert. They must therefore be considered as temporary binders which will have to be applied at more or less frequent intervals, according to local conditions. As a class, they will continue to be used in the treatment of old road surfaces for some time to come, both as dust preventives and road binders. In the resurfacing of old roads and the construc-

tion of new roads, however, their use will probably never prove satisfactory or economical, for in such cases the defects in the ordinary macadam road will merely be repeated, and a temporary remedy applied for a chronic trouble. Need for a modification of the ordinary form of construction is here made apparent, and, in the light of our present knowledge, the solution of the problem would seem to lie in the use of some form of bituminous binder of sufficient strength and durability to keep the road intact as long as the wearing surface exists. Many experiments have been tried along this line with different bituminous preparations, and the most variable results have been obtained. Some few successes have indicated the possibilities of the bituminous macadam road, and many failures have evidenced a lack of knowledge on the part of experimenters of the requisite characteristics of bituminous materials for work of this nature, and often a complete disregard of the probable effect of certain unmistakable properties upon the road when subjected to service conditions.



La Roche Avenue, Near Bona Bella. Savannah Auto Course

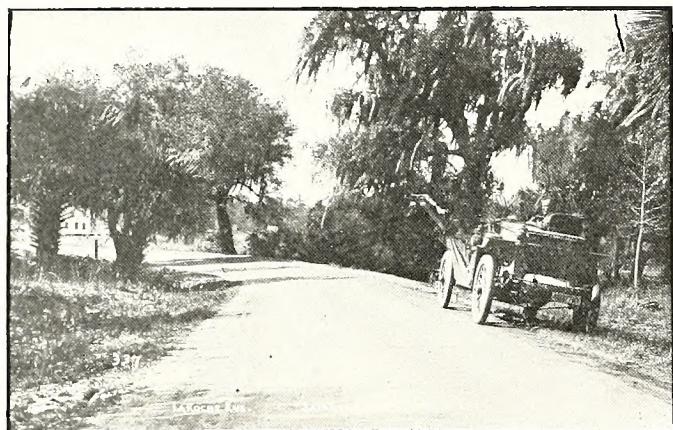
To deal with this phase of the subject in a satisfactory manner would require more time than I have. The bitumens would have to be classified according to their properties and use, and the effect of their various chemical and physical characteristics discussed at some length. In general, however, it may be said that the bitumens suitable for construction work consist of refined water-gas tars, coke-oven tars, gas-house tars, residual oil products holding an asphaltic or semi-asphaltic base, oil asphalts, and native asphalts and gilsonite fluxed to the proper consistency with a suitable carrying medium.

Binding value and consistency are two of the most important features to be considered with reference to the use of bitumens, in road construction, and, strange to say, these features have, in the majority of cases, been overlooked. The bitumen, as it exists in the road, should have the consistency of a semi-solid, and if such is lacking in the original material, it should have the property of hardening to the proper consistency, after being applied to the road. Most of the failures that have resulted from experimental work can be attributed to the use of fluid bitumens which after application remain in a fluid condition in the road, allowing the upper course of stone to creep and deform under traffic, producing a soft, sticky surface condition in warm weather by continually sweating and oozing upward.

There are two general methods of constructing bituminous macadam roads, each of which offers certain advantages. They are known as the penetration meth-

od. As commonly employed, no attempt is made to bind more than the upper two or three inches of stone with the bituminous material, as this has in most cases been found sufficient. Preference should undoubtedly be given to the mixing method, but its cost is usually somewhat greater, and for this reason it has not been generally adopted.

The penetration method consists in pouring hot bitumen upon the upper course of stone which has been well rolled and partially filled with clean stone chips not smaller than $\frac{1}{2}$ inch in diameter. The lower course should be firmly consolidated and its voids well filled with fine material before the upper course is laid, in order to prevent the hot bitumen from running through to the road bed. Application is made of approximately one and one-half gallons per square yard, since the object is to use enough to thoroughly coat the upper course of stone. The surface is then painted with hot bitumen at the rate of not over one-half gallon per square yard, and clean sand, or stone chips free from dust spread on in sufficient quantity to fill the surface voids and take up all excess of bitumen, after which the road is consolidated and made smooth by rolling.



La Roche Avenue, Savannah Auto Course

After this it is advisable to close the road to traffic for a day or two in order to allow it to set.

The principal disadvantages of this method are as follows: (1) It is almost impossible to obtain an absolutely uniform distribution of the bitumen. This results in the accumulation of the binder in pockets which are apt to produce soft spots, and in some portions of the road the individual stones are not sufficiently well covered to produce a satisfactory bond. (2) It is necessary to use more bitumen than is actually required to coat the road stone and bond them together. (3) It is difficult and sometimes impossible to employ a bitumen of sufficient original consistency to produce a satisfactory bond, owing to the fact that such bitumens congeal too rapidly when applied to cold stone to insure a proper penetration. The bitumen must, therefore, have the property of acquiring the right consistency after application.

On the other hand, this method has the advantage of being easily and rapidly carried out. No costly apparatus is required, and the labor item is comparatively low.

In the mixing method, a roughly graded broken stone aggregate is first coated with hot bitumen and then spread to a depth of two or three inches upon the foundation course. After being thoroughly rolled, this course is painted with hot bitumen and covered with sand or stone chips as described under the penetration

method. The process of mixing may be conducted either by hand or by mechanical mixers, and with either cold or hot stone, preferably the latter. Instead of separating the crushed stone into various sizes and then mixing the different sizes in given proportions, it is often possible to utilize the crusher run of material from 2-inch size to dust, thereby considerably reducing expenses. Other things being equal, that mineral aggregate having the lowest percentage of voids after being applied and rolled should produce the best results. About 6 per cent of bitumen should be employed in the mixture, and this will usually prove to be less than that required in the penetration method.

The disadvantages of the mixing method as compared to the other two are as follows: (1) The cost is as a rule somewhat greater. (2) With the same labor force, work can not proceed as rapidly. (3) To obtain the most economical results, more elaborate apparatus is required.

It has the advantage, however, of producing an absolutely uniform road in which the bitumen is evenly distributed throughout the uppercourse and covers each individual fragment of stone. Work can be successfully carried on during colder weather than is allowable for the penetration method. If no stone is employed, a bitumen can be employed of such original consistency as will be required in the finished road to satisfactorily meet local conditions.

Where suitable binders have been employed, satisfactory roads have been constructed according to both methods. In these roads the mineral aggregate is so firmly bonded that the surface is capable of successfully withstanding the strains imposed by automobile traffic, and at the same time the wear from horse-drawn vehicles is greatly reduced owing to the increased resiliency of the road. The ordinary macadam has been so modified that the products of wear are not essential to its life, and, in fact, its life is increased by reducing wear to a minimum. Hard rock, having no cementing value of its own, can be utilized to advantage in such roads, and less depends upon the character of road stone than in the case of ordinary macadam.

As traffic conditions become more severe, it is probable that a further development of the bituminous macadam will take place relative to the construction of the foundation course. A cement grouted foundation will in all likelihood be substituted for the old loose stone foundation, which is bonded simply by the mechanical interlocking of the various fragments, and this may be eventually superseded by a mixed cement concrete foundation. All indications point toward an evolution of the broken stone road toward what may be more properly called a pavement, where the limiting factors are the cost and the character of the traffic to which the road is subjected. One fact is at least certain, that the day of the macadam road is rapidly nearing its end. It has served its purpose for many years, but new conditions are insistently demanding a new type of road, and, if it is to exist at all in the future, it will have to be modified in some such manner as has been described.

\$25,000,000 For Roads.

Twenty-five million dollars for good roads in 1911 is the slogan of good roads enthusiasts of Texas. Such an enormous sum may not be expended during the next twelve months, but the interest now manifested in good road work assures many additional miles of improved public highways in Texas. A statement of the mileage of good roads in Texas and approximate cost per mile in the various counties will be found in the Texas Almanac for 1911.—Galveston News.

Road Work in North Carolina During 1910

By DR. JOSEPH HYDE PRATT, State Geologist

In obtaining statistics regarding the public road work in North Carolina, all the counties but one have made reports and the figures given below are based on these reports. During the year 1910 the number of miles of road reported as built during that year was 185½ miles of macadam, 15 miles of tar macadam, 388½ miles of sand-clay and 274 miles of gravel, this makes a total of 859 miles of road that were specially surfaced during 1910. The total mileage of special surfaced roads in the state is 3,814 miles, of which 927 miles are macadam, 1,344½ are sand-clay and 1,528 are gravel.

Besides the roads that are surfaced there were 814 miles of dirt road that were graded and crowned.

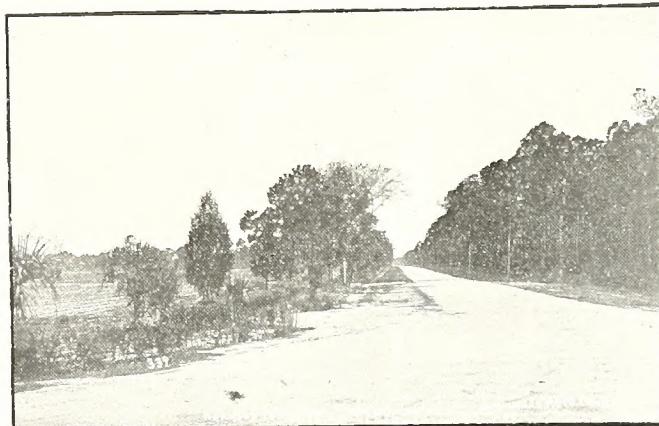
There are in the state, as reported by the various counties 46,850 miles of public road, of which 4,618 miles have been improved, leaving 42,308 of roads that have not been specially surfaced or made into any kind of permanent road, and it will be impossible for a great many years yet to surface these roads. Thus it is essential in the good roads work that provision be made for maintaining and keeping up the dirt road in first class condition by having these roads properly graded, free from stumps and rocks, and kept smooth and hard by a diligent use of the split log drag. This little machine will enable any county to maintain its dirt roads in first class condition at very small expense. By having, therefore, the main highways surfaced with macadam, sand-clay or other satisfactory material, and the dirt roads connecting with these kept well graded and smooth, will give a first class system of good roads throughout any county. At the present time, however, we have altogether too great a mileage of dirt roads that are not well graded and the road bed is too frequently filled with rocks, stumps and holes.

During the past several years twenty-four counties have begun active work in road building, either by the issuance of county or township bonds. The bonds issued to January 1st, 1911 amount to \$2,018,000 while those sold amount to \$1,718,000. Sixty-five counties have issued a special tax, either as a county or township tax for roads, the total amount of this during 1910 being \$758,375.28. Of this tax \$630,568.07 was expended by the county and \$127,807.21 was expended by the township. Twenty-seven counties have a certain per centum of the poll tax appropriated for road purposes. Sixty-three counties enforce a labor tax, requiring all able-bodied male citizens between certain age limits to work a certain number of days out of each year on the roads, the average number of days required for this work in the various counties being five. Thirty-five counties have the money obtained through taxation or bond issues expended by the county commissioners, twenty-six by the township commissioners, and twelve counties by the road supervisors, overseers, trustees and so on. Thirty-nine counties use convicts in the repair and construction of their roads, amounting to approximately 1,364 men during the year, and thirty-two counties lease their convicts to other counties. Twenty-four counties are contemplating the issuance of bonds for road work, either as county or township, during 1911.

There is a great variation in the method of raising revenue by the various counties and townships for public road work, and also in the method of expending same. Although considerable thought and time have been given to the question of some uniform road laws in the different counties, as yet no great headway has been made along this line, except as regards the employment of road engineers to supervise the expenditure of the revenue raised for construction and maintenance of the public roads. Nearly all of the counties throughout the state realize the need of road engineers to supervise the location, construction and maintenance of their roads, if they are to obtain the best results and the most economical expenditure of their revenue.

Official Call for the Fourth National Good Roads Congress.

"Positive declarations for good roads having been made by the national party platforms of both the great political parties for the first time in the history of our country at Chicago and Denver in 1908, immediately after the sessions of the First National Good Roads Congress, and many millions of dollars having been



Norwood Avenue. View from La Roche Avenue. Savannah Auto Course

appropriated by a few states for good roads, which are matters of the most vital importance to all states, and, believing that all good citizens in every state should insist on having good roads and streets and that national conventions for the full and free discussion of the best ways and means for securing them give an impetus to a great patriotic and economic movement in the interest of all classes and conditions of people, the Fourth National Good Roads Congress is hereby called to meet at Birmingham, Ala., May 23, 24, 25 and 26th, 1911, that the results of the deliberations may be presented to all legislative bodies and the public generally. Delegates from every state in the union are requested to attend The Fourth National Good Roads Congress.

ARTHUR C. JACKSON, President,
J. A. ROUNTREE, Secretary.

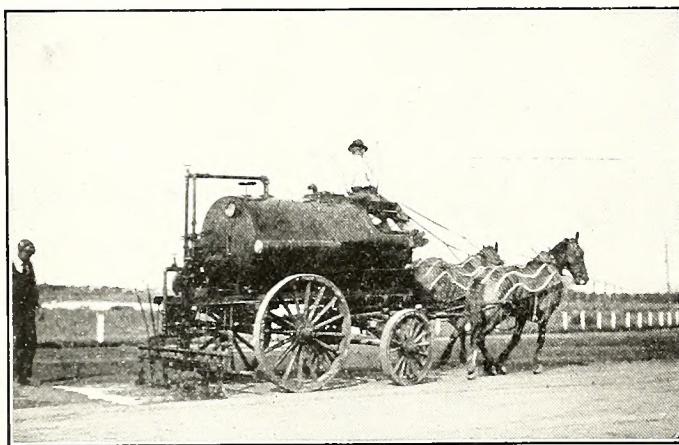
The Minnesota Retail Hardware Dealers' Association in session at St. Paul last month, went on record as favoring good roads.

Help Your Supervisors.

Good roads played a prominent part in the proceedings of the State Livestock Association held recently at Harrisburg, Pennsylvania, showing the interest manifested in the subject, among all classes. One of the most interesting addresses of the meeting was made by Dr. Donald McCaskey, a supervisor of East Lampeter, Pennsylvania, and secretary of the Lancaster County Supervisors' Association. Dr. McCaskey, who is one of the most active and enthusiastic of good roads advocates, urged upon people of the country districts not to wait until the state builds roads, but to give active assistance to the movement for good roads by co-operating with instead of criticising the supervisors. Dr. McCaskey is a prominent member of the Lancaster, Penna. Automobile Club.

"Don't wait for the highway department to do it all. They can't," said Dr. McCaskey. "There will be money provided for this department very likely to carry on the road building, but don't wait until they start operations. Your roads are probably bad and meantime you will stick in the mud."

"I used to keep horses, but a few years ago I sold them and got an automobile. I soon found that it was impossible to go over the roads near my home, and I could not get the supervisors interested in making re-



High Pressure Road Oil Sprinkler; Insuring Even Distribution. The Type Used by the Standard Oil Company in Applying Its Well Known Standard Road Oils

pairs. The roads were full of ruts, without crowns and very muddy in wet weather. I tried every way I could think of to get the supervisors to do something, even trying to get them to take a ride in my machine so that we could all get stuck in some muddy spot together. They refused to accompany me. Then I got a camera and took pictures for a year and showed them the pictures. This brought about no results.

"Finally, when I saw that it would be necessary to give up the automobile unless something was done to better conditions, I heard of the King split-log drag. I got one and worked revelations in a few hours. I could not get any of my neighbors to help me, so I hired their teams and did the work myself. Now, the very fact that I did this work myself was of course not a popular move on my part so far as the supervisors were concerned. It, however, got them reflecting and thinking about the matter.

"There, gentlemen, is the solution to the whole problem. If you aid and co-operate with the supervisors instead of sitting still and criticising them you can work wonders. The supervisors have a great deal of authority, and if they care to can become real autocrats. Every man can help make the roads in his sec-

tion better. If you can't get a split-log drag, get a railroad tie and begin at once. Write to Commissioner Hunter, of the Highway Department, for a pamphlet on how to make a log drag, if you don't understand the matter thoroughly."

Proposed Experiment in Road Improvement.

On February 17th, the following bill was introduced in the senate of the United States by Senator Frazier:

A bill to provide for an experiment in the improvement of certain highways by the Secretary of Agriculture, in co-operation with the Postmaster General, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, the sum of one million dollars, to be expended by the secretary of agriculture, in co-operation with the postmaster General, in improving the condition of the public roads over which rural delivery is now or may hereafter be established, to be selected by them as near as may be in the different sections of the country, for the purpose of ascertaining the possible increase in the territory which could be served by one carrier by reason of such improvements of public roads, the amount required for proper maintenance in excess of local expenditure for rural-delivery routes, and the relative saving to the government in the maintenance of rural-delivery routes by reason of such improvements, and also the relative saving in the cost of the transportation of agricultural and other products from the farms or other points of production to the usual market places by reason of such improvements: Provided, That the state or county or counties which may be selected for improvement of rural delivery routes therein under this provision shall furnish an equal amount of money for the improvement of the rural route or routes so selected.

The Parkersburg district, Wood county, W. Va., has voted to issue bonds for \$180,000 for the improvement of about 10 miles of roads.

Elmore county, Ala., will soon have \$170,000 available for road work as the result of a bond election carried recently.

Alvin district, Brazoria county, Tex., will vote on March 28 on a bond issue of \$150,000 for roads.

Columbus county, Tex., will issue bonds for \$250,000 for roads.

Precinct No. 1, Lamar county, Tex., will issue bonds for \$75,000 for road improvement.

Morgantown, W. Va., will vote April 6, on the issuance of \$35,000 of bonds for improving streets.

Shreveport, La., will vote April 4, on issuing bonds for \$250,000 for improved streets.

Tazewell county, Va., will hold an election April 11 to decide on a bond issue for \$650,000 for building good roads.

Anson county, N. C., will vote soon on issuing \$300,000 of bonds for the building of good roads.

Macon, Ga., has just awarded a contract for the laying of 100,000 square yards of brick paving.

Dallas, Tex., has awarded contracts for paving seven streets.

Louisville, Ky., is preparing to construct 32,000 square yards of asphalt paving, costing \$70,000 and 15,000 square yards of vitrified brick paving, costing \$28,000.

Richmond, Va., has set aside \$254,000 for street improvement during 1911.

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DR. JOSEPH HYDE PRATT, Secretary and Treasurer, Chapel Hill, N. C.

Official Organ Southern Appalachian Good Roads Association

DR. JOSEPH HYDE PRATT, President, Chapel Hill, N. C.
W. L. SPOONER, Secretary, Burlington, N. C.

Official Organ of the South Carolina Good Roads Association

F. H. HYATT, President, Columbia, S. C.
FINGAL C. BLACK, Secretary, Columbia, S. C.

VOL. III.

MARCH, 1911.

No. 3.

A WORTHY EXAMPLE.

Gen. T. Coleman DuPont, one of Delaware's millionaires, a member of the E. I. DuPont Powder Company of Wilmington, Del., has formally offered to build a macadam highway across the state of Delaware, a distance of 102 miles, at a cost of \$2,000,000. This great road is to be of the finest type yet devised, laid off and built under the direction and supervision of the leading road experts of the nation. Mr. DuPont recognizes the importance of good roads. He knows that good roads will mean more to the people of his state than any number of free library buildings, magnificent parks or heavily endowed colleges and he takes this method, in preference to those made popular by other philanthropists, as the one offering the greatest measure of real worth and service to his fellow men.

Mr. DuPont has pointed the way for others desirous of doing good. There are many hundreds of men of wealth in the country that could give amounts ranging from \$100,000 to \$500,000 and not a few that could give as much as Mr. DuPont, or even more. There are tens of thousands of men that could give amounts ranging from \$1,000 to \$50,000 and we believe that when the capitalists of the nation come to realize the vital relation that exists between good roads and the mental, moral and industrial welfare of the people, that less will be thrown away for magnificent library buildings and like benevolences, whose value to those for whom they were intended is questionable, to say the least of it.

It is a fact that no man can serve his country better than by devoting time and attention to the road question. If you can not do as Mr. DuPont has done and offer your state a couple of millions, do what you can. Give every cent that you can give and in so doing you will do as well as this great captain of industry has

done. If you have not money to give, go to work and improve the road that runs by your door. The main thing is to do something. Don't be a drone. Don't sit and wait for something to turn up, but pitch in and turn something up.

We have nothing to say about the man who feels called upon to lavish his surplus wealth on his pet charity, whatever it may be, and we do not question the fact that Andrew Carnegie's libraries have done much good and that Rockefeller's donations to institutions of learning have been of some real benefit to the human race, but we believe that when the time for the final accounting comes that Mr. Coleman DuPont's name, like that of Bou Ben Adhem, will "lead all the rest."

* * *

Charles Frederick Carter, in the Technical World, for March, has a very interesting and readable article on the haphazard, hit-or-miss policy of our country as to road building and maintenance. He makes the statement that the American people "are holding their own," citing as proof the fact that forty million dollars was wasted on the public roads of the United States through ignorance, incompetence and indifference in 1904 and the same amount in 1910. His array of figures is imposing, not to say astounding, and he backs up every statement that he makes in a most convincing manner. He ends his masterly review of road conditions with the statement that "there are so many hopeful signs of improvement every where that it seems safe to predict that within ten years the administration of the public roads will be established upon a satisfactory basis. Newspapers, colleges, men of power and influence, lawmakers—men of all conditions and kinds—are bending their energies and giving their best thought to the task of working out the good roads problem satisfactorily and out of the blundering and the extravagance will be evolved a system that will be almost ideal.

* * *

One of the biggest problems in road building is that of getting the right man to supervise the expenditure of the money raised by bond issue, special tax, or other method. In the Chase City district, over in Mecklenburg county, Va., they were so fortunate as to secure the services of Colonel Lucius Gregory, a fine business man and well-known wagon manufacturer. After a long fight a bond issue of \$60,000 was voted nearly two years ago and Colonel Gregory was prevailed upon to sacrifice his time and his business to the work of planning a system of roads and building them. There was considerable delay in getting convicts but the Colonel was not to be deterred by a little thing like that. He went ahead and bought a complete road-making outfit. He bought wisely and the outfit cost about \$10,000. Then he began to build roads out from Chase City and seven miles of the finest road in Virginia has been built at a cost, including the amount spent for machinery, of \$25,000. There will be three other roads built out from Chase City about the same distance, and Colonel Gregory expects to complete the whole system, com-

prising about 40 miles of good rock road, with the balance of the \$60,000. The country needs more unselfish business men of the Gregory type, who are not only in favor of good roads but who are ready and willing to devote their business talents to the work of building roads wisely and well.

* * *

"There is nothing like an object lesson to impress the religion of good roads on an old croaker's heart," says Frank Woodson, industrial editor of the Richmond Times-Dispatch in an article telling of the changes of heart that followed the voting of a bond issue and the building of good roads in a certain district in Virginia. One citizen was especially bitter in opposing the voting of bonds and he fought it to a finish. Recently, after having lived a few months on a first class macadam road he declared that he wants another bond issue and more good roads built and that he is willing to be taxed heavily until his dying day, so that his children that are coming after him may not be the "horse murderers" that their father and father's father have been.

* * *

President George A. Gowan, of the Memphis to Bristol Highway Commission, has pointed the way for real and practical publicity in the good roads movement. He has just sent out a circular letter to every mail carrier in the state of Tennessee, urging them to become good roads drummers, eternally talking the advantages of good roads to their patrons. If he can enlist the carriers in the good roads warfare he will have accomplished something. The rural carriers, as a class, are men of intelligence and considerable influence. They can work wonders in the country districts. This strikes us as a mighty fine plan and it would not be a bad idea for other good roads boosters to follow the example set by Mr. Gowan.

* * *

"Solons insistent for good roads," reads a head-line in one of the leading newspapers of the union. It might be well to explain that this excellent paper was not referring to the sapient law-makers of the North Carolina legislature, which has just adjourned.

* * *

The city of Richmond, Va., is rejoicing over its good fortune in securing the first annual meeting of the American Association for Highway Improvement which is to convene in that city next October. The invitation of the Richmond Chamber of Commerce was accepted on behalf of the association by Hon. Logan Waller Page, president of the association and head of the Office of Public Roads, United States Department of Agriculture.

A Striking Example.

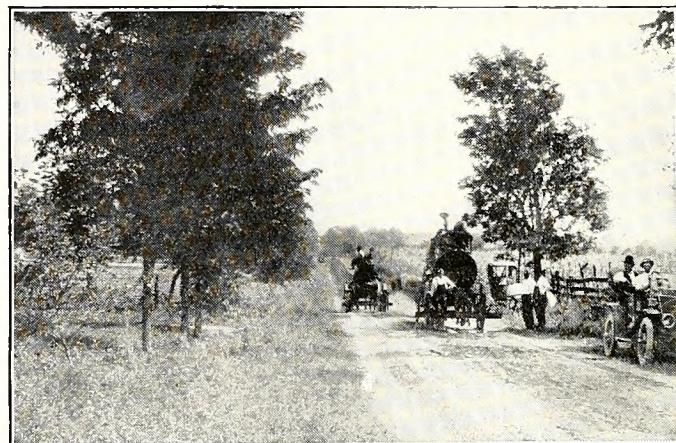
What does a good road mean to a rural school? What does a good road mean to a rural community socially?

A certain township in southeast Kansas saw fit to construct two miles of rock road, from a small town south through a rural school district. Six children of school age lived on farms adjacent to the rock road,

and six on the same length of earth road in the west part of the school district. The earth road was in poor condition most of the time, says the K. S. A. C. Industrialist.

The children on the good road went to city schools, walking most of the time. The children on the almost impassable earth road went to a rural school. At that time the instruction in the town school was not any better than the rural school, in the common branches. The city school was not what it ought to have been. The rural school was noted for its excellent instructors.

Two of the children living on the rock road are now sophomores in agricultural colleges, two are seniors in high school, and two are freshmen in high school. All of them are interested in agriculture, will graduate from agricultural courses and return to the farm.



Independence, Mo. Treating a Country Road with the Standard Oil Company's Standard Road Oil

Two children living adjacent to the earth road finished the rural school. Their interest in education was balanced against the almost impassable condition of the road the greater part of the school year. Now they are hardly average farmers. Four became discouraged and quit the rural school before they were graduated. Three of them are day laborers in a nearby town. The fourth is owner of a small restaurant in the same town.

The children of the rock road walked to church, Sunday school and lectures, and attended the social events in town and in the country adjacent to the rock road.

It hardly seems possible that a stretch of two to four miles of poor road would make a difference in one's life, does it? But it did.—Wichita (Kan.) Eagle.

High Honor for Case Car.

The officers of the Wisconsin State Automobile Association have accepted the offer of the J. I. Case Threshing Machine Co., of Racine, Wisconsin, and will use a Case Touring Car, during the Annual State Reliability Run next July, for the Technical Committee.

Thus it is that a Case Car heads the Wisconsin State Reliability Run.

The Company received, yesterday, an acceptance of the offer signed by Mr. James T. Drought, of the Executive Committee.

The town of Dayton, Tex., and the district surrounding it, are planning to spend \$200,000 in building fine shell roads in all parts of the district.

A movement has been started to issue bonds for \$150,000 to build roads in Crockett district, Houston county, Texas.

The Central Highway Convention

By ELWOOD E. BRITTON, City Editor News and Observer, Raleigh, N. C.

At a meeting that was enthusiastic for good roads in its large attendance, in speeches, in resolutions, and in the adoption of a bill to carry out its views, delegates from fifteen counties assembled Tuesday, February 14th, in Raleigh in the courthouse at noon and put themselves behind the movement for a great Central Highway across North Carolina, from Beaufort Harbor to the Tennessee line, passing through nineteen counties of the state.

There were present over two hundred delegates, this an evidence of the deep interest that is felt in the proposed central highway. Throughout the meeting there was not one discordant note, the proposed legislative bill for the central highway being adopted by a unanimous vote after it had been carefully considered by a committee representing all the counties in the meeting, with some minor amendments agreed upon in the committee meeting. As a final matter the central highway meeting appointed the senators and representatives from the nineteen counties of the route, with Messrs. Jas. H. Pou, Edward E. Britton and J. V. Simms, of Raleigh, and H. B. Varner, of Lexington, as a legislative committee to present the matter to the general assembly.

Mr. H. B. Varner, of Lexington, editor of Southern Good Roads, was elected chairman of the meeting after it had been called to order by Dr. J. M. Templeton, of Cary, president of the Wake County Good Roads Association. Mr. Varner expressed his appreciation of the honor. He declared that a great central highway would be of great advantage to North Carolina, that it would prove an object lesson of value when constructed and would advertise the state.

As secretaries Messrs. Edward E. Britton, J. V. Simms and the members of the press were elected and when the roll was called it was found that fifteen of the nineteen counties affected were represented. Then the purpose of the meeting was stated by Mr. Edward E. Britton, who, in doing so, read a proposed legislative bill prepared by Mr. James H. Pou, who was unable to be present, the bill giving in detail a suggested plan of work and the machinery for securing a central highway.

After the conclusion of the reading Dr. Joseph Hyde Pratt, State Geologist, was introduced. He declared that the plan proposed was a feasible one and that a start could be made. He said that such a central highway would prove an incentive to the building of lateral lines of roads. He told of what other states had done and said that the attendance at the meeting, from Madison on the west to Carteret on the east showed the interest in the movement. He pledged his hearty co-operation.

Col. P. M. Pearsall, of New Bern, here moved that a committee composed of one delegate from each county meet and pass upon the bill proposed. The motion prevailed, and the committee was named by each delegation, the only counties not represented being Jones, Wayne, Burke and McDowell. Dr. Joseph Hyde Pratt was added to the committee by resolution, the other members being:

Carteret, G. D. Canfield of Morehead City; Craven, C. D. Bradham of New Bern; Lenoir, J. F. Hooker, of Kinston; Johnston, James A. Wellons of Smithfield; Wake, D. J. M. Templeton of Cary; Durham, P. C. Graham, of Durham; Orange, J. D. Webb of Chapel

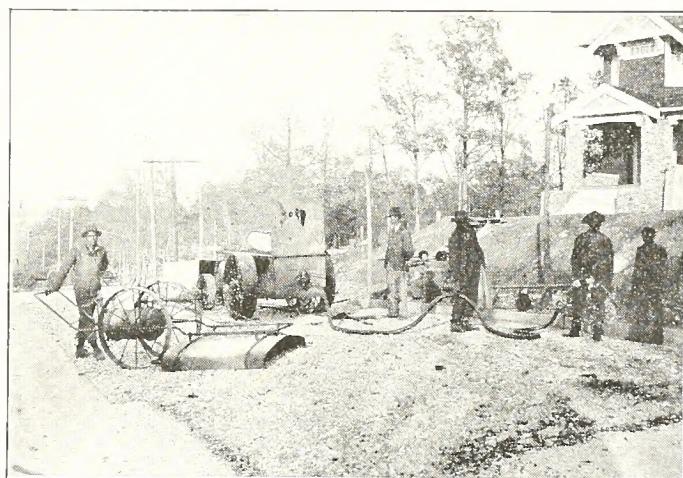
Hill; Alamance, S. H. McLean of Greensboro; Davidson, H. B. Varner of Lexington; Rowan, C. M. Miller of Salisbury; Iredell, H. P. Grier of Statesville; Catawba, C. H. Mebane of Newton; Buncombe, J. W. Rutherford, of Candler; Madison, N. J. Lance of Hot Springs.

The committee retired and there were a number of talks made endorsing the movement as well as a general expression of the value of good roads to the state.

Major W. A. Graham, Commissioner of Agriculture, endorsed the plan and told of movements in North Carolina for good roads as far back as 1838. He declared that the interest shown meant more good roads in North Carolina.

Mr. H. B. Varner said that it would be well to name a day for general work along the proposed highway relating in this connection how 380 miles of road were put in shape in one day in Iowa.

Mr. J. T. Broughton, of Garner, expressed the opinion that the convicts should be put to work on the roads and that the state farm should be abolished. He called on Major W. A. Graham for an expression and Major Graham replied that while the state's prison is making



Birmingham, Ala. Spreading Standard Oil Company's Standard Macadam Asphalt Binder. Surface Liquefy Drying Moisture For Roadway Before Application

money that he would like to see the convicts put to work in making good roads. Chairman Varner here stated that many organizations in the state, the State Press Association, the Dental Association, the Medical Association, Rural Letter Carriers', etc., had endorsed such use of convicts.

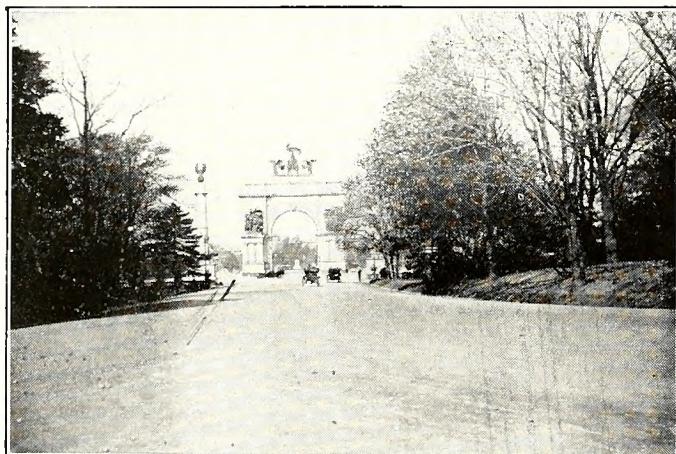
The use of convict forces on the roads of various counties were told of by Messrs. C. J. Griswold, of Durham; N. B. Mills, of Statesville; B. C. Beckwith, of Wake; C. E. Foy, of New Bern, each telling of the value of the work and the desire of the people for good roads. Mr. Foy said that Craven county was able to get convicts from other counties by simply paying their railroad fare and taking care of them. Major W. A. Graham told of having lately found an old book with a road plotted from Pleasant Garden to Murphy. Mr. Howard A. Banks, editor of the Hickory Democrat, said that the road from Rowan to Buncombe is now well organized, and that there was now already completed fully one-third of the proposed highway. Mr. F. H. Brooks said that Johnston county was in good

shape with a few miles to be worked. Colonel Ben-han Cameron told of the need of linking up the states as well as the counties, and of the work being done to get a national survey. He told of good road work in Virginia, and of the value of a Highway Commission. One need, he said, was to give help to the weak counties. He described the good roads of Europe and told of their value, as also of organizations at work in this country.

Mr. W. L. Gilbert, of Statesville, said that as to one day for the building of a road, he thought the date should be fixed by the trustees named in the Central Highway bill.

Colonel John S. Cunningham, of Person, being called on, made a vigorous speech. "Funds and more funds," he said, are needed. Other states are spending money freely for good roads. The penitentiary convicts ought to be put to work on the roads. The state must help the weak counties. A central highway would help build up the state.

Chairman Varner called attention to the fact that any locality desiring aid in locating roads, etc., could get this from the United States Office of Public Roads at Washington. He also told of the work of the American Association for Highway Improvement. Colonel Cameron called attention to a general road meeting of all road organizations in Richmond in May.



Entrance to Prospect Park, Brooklyn, N. Y. Drives Treated with Standard Oil Company's Standard Emulsifying Road Oil

Mr. F. H. Brooks, of Johnston, offered a resolution that in the bill adopted that it be provided that the penitentiary furnish a contract force of not less than 100 men and that the state supplement the funds raised by towns and counties along the route of the Central Highway. After some discussion it was offered as a separate resolution but was voted down. Everybody in the meeting favored the resolution, but it was felt that at this time it might affect the passage of the central highway bill.

The committee having the proposed bill in charge at this time returned to the court room, and for the committee, Dr. Joseph Hyde Pratt reported that with a few changes the bill as prepared had been adopted. He read the changes, and after some discussion the bill was adopted unanimously, and a committee, as indicated above was named to present it to the legislature.

The Pennsylvania Good Roads Special Train.

The Office of Public Roads of the United States Department of Agriculture is co-operating with the state college, the State Highway Department of Pennsylvania, and the Pennsylvania railroad in operating a special good roads train over the lines of this road in the

state of Pennsylvania. The object of this project is to arouse interest on the subject of better roads, and to teach farmers and road officials the fundamental principles of road construction and maintenance.

The train consists of four cars and an engine. On two of the cars all kinds of road-building machinery is displayed, including a reversible road grader, a stone crusher, and a road roller, as well as practical home-made road-making equipment and tools including the split-log drag.

A passenger car is fitted up for lectures, and provided with stereopticon, and is so arranged that lectures may be given at any time, day or night. The car seats about one hundred people, and is only intended to be used at the smaller towns. Where the meetings are held in the larger towns, opera houses, court houses and moving picture theaters are used for the lecture work.

A large postal car has been specially equipped for displaying models showing fifteen of the standard types of road construction. These models illustrate the building of earth, sand-clay, gravel, macadam, brick, and bituminous macadam roads. They are built to scale, and are about three feet wide by five feet in length. One model shows a quarry face and a miniature crushing plant in actual operation. Another shows a macadam road on which a miniature steam roller, built to exact scale, is in constant operation, illustrating the method of rolling and the necessity for it. The miniature crushing plant and roller are operated by electricity, the car having been especially equipped with batteries for this purpose. The sides of this car are appropriately decorated with large bromide photographic prints showing good and bad roads in various parts of the United States, and illustrating the construction of various types of roads built under the direction of the U. S. Office of Public Roads. The models and bromide prints have been furnished by the U. S. Office of Public Roads. A portion of the wall space in the postal car has been decorated by the Pennsylvania State Highway Department with views showing state road work in various parts of that state.

Mr. J. P. Jackson, dean of the school of engineering of the state college of Pennsylvania, has charge of the tour, and is assisted by Mr. J. H. Dodge, a road expert of the office of public roads. Mr. D. H. Winslow, a highway engineer, represents the office of public roads. These gentlemen give lectures and demonstrate the various exhibits, distribute road literature, and wherever the opportunity is favorable teach the farmers how to build split-log drags, and other home-made equipment for building and maintaining roads. A representative of the Pennsylvania State Highway Department also accompanies the train, for the purpose of making talks on the practical side of road-building, and in regard to the work of the state highway department.

These cars and a special engine to pull and heat them are supplied by the Pennsylvania railroad, and the railroad and the college are co-operating in advertising the tour. It is expected that this work will continue for about two months.

The first meeting was held at Harrisburg on January 25, and since that time from four to six stops have been made each day, except on Sundays. The train is being received with great enthusiasm wherever it goes. At Indiana, Pa., on February 7, 1,700 people passed through the exhibit car, and the train was met at the railroad station with a brass band. The hall where the meeting was held was taxed to its utmost capacity. From January 25 to February 7, 14,903 people had passed through the exhibit car. At this rate, it is expected that about 75,000 persons will view the exhibits before the itinerary is completed.

Good Roads Notes Gathered Here and There

Arkansas.

In addressing the convention of the Arkansas Good Roads and Drainage Association, John B. DeBoise of White county urged that the legislature take steps to have built the system of state roads that was shown on the handsome map published in the good roads edition of the Little Rock Gazette and said the people would stand back of their lawmakers in any legislation that made for better roads.

"If you take this action," said Mr. DeBoise, "the value of the farm lands will be increased from \$50 to \$100 an acre and you will be known as the best legislature that the state has ever had."

The Gazette adds that "nothing would benefit and advantage the people of Arkansas more than a system of state roads and no legislature could do a greater service for the state and its people than to have work begin on good roads to cover the whole state."

* * *

Florida.

One of the latest and most ambitious projects in the line of road building in Florida is told of in a recent issue of the Florida Times-Union. It provides for a hard clayed road from Mount Dora, through Sorento and on to the Wekiwa river, a total distance of about fourteen miles. The Orange county officials have pledged themselves to take up this road at the river, the dividing line between Orange and Lake Counties, and carrying it through the remaining ten miles to Sanford. Such an improvement would practically open this region to wagon traffic and automobiles, and make it part of the large clayed system running from Leesburg to Orlando on the west and from Sanford to Orlando on the east, not to mention other less important hard road connection. After any severe storm all roads from this point in every direction are blocked with wreckage, requiring weeks to make them decently passable. Roads of this character are naturally "blacklisted" by the hordes of winter tourists, who navigate all over Florida prospecting for winter homes.

In Southern Florida Hillsborough county is wide-awake on the subject of good roads. In the words of the Tampa Times, "the good roads bug has certainly got his sting in Hillsborough county and it is a good sting to have." The Tampa Automobile Club and the Tampa Board of Trade are responsible for the road work and several fine stretches of road have been built by private subscription. Three miles are now being built in that way.

* * *

Georgia.

The proposition to extend the great National Highway from Atlanta to Jacksonville, met with instant favor in all parts of the Cracker State and it will be pushed through without delay. All of the south Georgia counties through which it will pass are right in behind the proposition.

At Savannah and Augusta there is much interest in the proposed highway to link these two towns together. Recently a number of autoists from both towns met on half way grounds and talked the matter over. The distance between the two cities is 134 miles. Of this about 79 miles is in first class condition—macadam and sand clay and 55 miles is unpaved. So interested in the project are the counties along the line that the commissioners of Effingham county recently agreed to bear all the expenses of maintenance if the Chatham

county authorities would build a good road across their county from the Effingham line to Jenk's ferry.

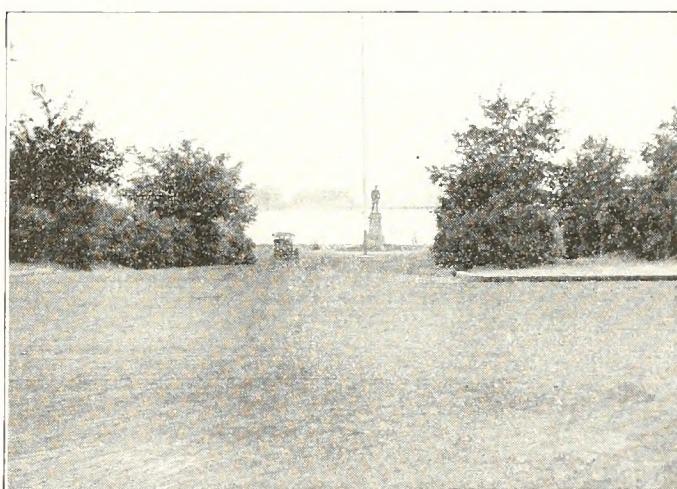
Another interesting highway scheme is being planned by good roads enthusiasts of Brunswick, Ga., and Jacksonville, Fla., and recently 300 people from Brunswick, Jacksonville and Fernandina met at Owen's Ferry for the purpose of formulating plans for the road and a number of good speeches were made. A big convention was called for March 28, at Jacksonville, and at this meeting the official route between the two cities will be mapped out.

* * *

Michigan.

Michigan has a state road law that is admirable in many respects. The state pays a "reward" to every county building roads that are up to the approved standard. The good roads advocates of the state fought for this system for many years and now that they have it they are not content. They are asking that the state rewards be made larger, and they have prepared a new road law that fills their needs.

At the present time the state pays a reward of \$1,000



Farragut Road Entrance, Marine Park, Boston, Mass.

a mile for a nine-foot road. No additional allowance will be made for wider roads. Road-builders are unanimous in the opinion that a trunk line road through a county should be at least 15 feet wide, and one of the purposes of the new bill is to provide for an increased reward when the wider road is built. The counties which are behind the bill suggest that the state pay \$3,000 a mile for 15-foot roads. The cost of construction of a nine-foot macadam road is from \$4,000 to \$6,000. A road of 15 feet in width would cost from \$6,000 to \$8,000, and these counties believe that the state should contribute \$3,000 of this amount.

* * *

New York.

If a bill introduced into the New York Assembly by John B. Trombly of Clinton meets with success, an unbroken stone road will be constructed from New York to Rouse Point, N. Y., at the northern end of Lake Champlain. The bill provides that the highway be located along the east bank of the Hudson river and skirt the shores of Lake Champlain. An appropriation of \$1,000,000, to be realized on bonds, is provided. If the act becomes effective, motorists will have a stone high-

way running the entire length of the state, and it will make Canada easily accessible.

* * *

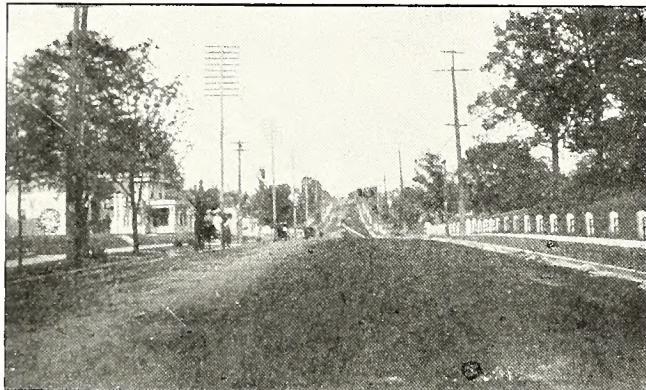
Nebraska.

At Lincoln, Neb., a movement has started that has for its object the building of a great highway stretching across the state. The road is to begin at some point on the Mississippi river in Iowa, running through the southern tier of Iowa counties, beginning at Fort Madison or Burlington and ending at Nebraska City. It is hoped to also enlist the interest of the folks in the southern tiers of Nebraska counties so that the road may be extended clear through this state and to Denver. This road is to be kept up by the work of farmers along its entire length, under the supervision of the road overseers, under pledges first secured that it will be done.

* * *

Oregon.

The fight for good roads in Oregon is at a most critical point. The statewide campaign of the last year and the \$8,000 freely contributed by prominent Portland citizens, will have been time and money and effort wasted unless the members of the legislature realize



Sand Clay Road

the need for providing for good roads now. The five highway bills now pending before the legislature must be passed and be made operative, or the whole good roads movement will suffer a slump, and a slump in the good roads movement will mean a slump in the development of the state.

* * *

Tennessee.

In Loudon county, Tennessee, a live good roads meeting was held last month at which a bond issue of \$100,000 for improved roads was determined on. There were present at the meeting 100 of the wealthiest and most prominent citizens of the county. Mr. J. R. Browder, a leading citizen, was named as chairman of the convention and Mr. C. J. Cunningham, editor of the Loudon County Record, was made secretary. A committee was named to draft a bill providing for an issue of \$100,000 of 30-year, 5 per cent bonds and the following citizens were named as road commissioners: First District, J. R. Wilson; Second District, J. W. Norwood; Third District, T. J. Williams; Fourth District, Dr. Penland; Fifth District, John Tootle. Chairman Browder, in the course of his address, gave some facts that other counties of Tennessee and of other states would do well to consider. In showing his hearers where the money for building the roads would come from, Mr. Browder stated that from a carefully compiled list taken from the tax lists of the county, 45

per cent. of the tax of the county was paid by the Southern and L. & N. Railroad Companies and other corporations such as the Loudon and Lenoir City Hosiery Mills and other smaller industries; 30 per cent of the taxes were paid by 100 men of the county, and the remaining 25 per cent. was scattered among the smaller farmers and residents of the county. The persons who were so religiously opposing the issuance of bonds in Loudon county really pay about 10 per cent. of the taxes, and it will be found that the same conditions prevail elsewhere.

Washington county is also preparing to build roads and a committee is at work preparing a bill for presentation to the legislature to provide for the issue of bonds for half a million dollars for good roads. The Knox county Good Roads Association has been very active for the last month and has accomplished a great deal.

* * *

Texas.

One of the liveliest organizations in the live state of Texas is the Gulf Coast Good Roads Association. The association has set itself to the task of building a good macadam road from the Sabine river in the east to the Rio Grande in the west and when it is remembered that Texas is a great, big empire in itself, it will be seen that this is an undertaking of considerable magnitude. Not content with aspiring to do this, the association also announces that it is going to build a similar road from the Gulf of Mexico to the Red River. Half a dozen counties through which the roads will pass have already voted bonds to aid in the construction and a score of others are working for bond issues.

At Marlin, Tex., a few days ago several patriotic citizens appeared before the county commissioners and offered substantial aid for the construction of a good road from Marlin to the McLennan county line. These citizens offered to contribute \$3,000 in cash and stated that the farmers along the line had agreed to furnish free gravel, wagons, teams and 200 days of labor toward building the road and all they asked was the use of the county's road-building outfit and men. They got it. That is the spirit that is at work all over Texas and that is building good roads in every nook and corner of that great commonwealth.

Within a few weeks there will be an automobile tour over the greater part of the state. As planned now the tour will cover 1,000 miles, touching the principal cities and towns and spreading the gospel of good roads everywhere. A scout car was started over the route February 25th.

Dallas county, Texas, one of the most progressive counties in the south, now boasts that it has 400 miles of good smooth macadam and 600 miles of well-graded, well-kept dirt roads and is still building. At Denison, Tex., a contract has been let for the building of 69 miles of macadam at a cost of \$250,000. At Williamson, contracts have been let for \$150,000 worth of road work. The great highway from Port Arthur to Galveston, via Beaumont and Houston, which is now a certainty, is to be 150 miles in length and will pass through five counties. Colorado county is to issue bonds for \$200,000. At Tyler, Tex., the county farm, consisting of 846 acres of the richest farming lands in the state, although self-supporting and dividend-paying, has been ordered sold and the proceeds will be invested in road-building machinery. The convicts will be worked on the roads. The people of Texas are wide awake and this road activity is not confined to any one locality.

Virginia.

The people of Virginia have on foot a number of ambitious projects and they are going at them like they meant business. As told in Southern Good Roads last month an association has been formed to build a highway from Richmond to Newport News, passing through all of the counties of the peninsula, and the members of this association have been very active. Another association was formed a few days ago to promote the building of a highway from Richmond to Gordonsville. It is composed of citizens of Henrico, Hanover and Louisa counties and is known as the Richmond, Louisa and Gordonsville Highway Association. The Richmond Journal summarized the work done by the association at its first meeting in Richmond as follows:

Mayor Richardson promises to do all in his power to aid movement. Declares he will sign a bill calling for appropriation for the improvement of roads.

Richmond, Louisa and Gordonsville Highway Association organized; Officers elected, Executive Committee appointed. Fifty members join before adjournment is taken.

Gov. Mann promises to employ convict labor if funds are available. Points out need of money to build highways. Urges agricultural development that good roads may follow.

President Horace Hawes declares prosperity will follow good roads.

Capt. P. St. Julien Wilson says a good road may be built to Gordonsville for \$7,000 to \$10,000. He will do everything practicable to aid movement.

Judge Simms, J. E. Ribb, C. H. Oliver of Oliver's, F. F. Ester, Lee Rosson, C. B. Meredith, George H. Johnson, Roswell Page and C. W. Throckmorton promise aid and support of landowners and farmers in Louisa, Hanover and Henrico counties.

Good Roads Notes in Brief

Memphis, Tenn., wants to issue bonds for \$750,000, two thirds of which will be used in continuing street work.

Simpson county, Miss., has awarded contracts for road work amounting to \$40,000.

Dallas, Tex., is asking for bids on street work amounting to about \$30,000.

Talbot and Caroline counties, Md., opened bids on February 27 for a large amount of macadamizing and grading.

Baker county, Fla., has got aboard the good roads band wagon and will build an extensive system of hard-surface roads.

The annual convention of the Missouri Association of Highway Engineers was held at Cape Girardeau, Mo., February 16-17. Addresses were made by a number of celebrated road experts, among them being Curtis Hill, highway engineer of Missouri, ex-immigration commissioner Jas. H. Curran and James T. Voshell of the United States Office of Public Roads. There was a large attendance, many engineers being present from Illinois.

In Emmons township, Davidson county, N. C., a good roads and agricultural association has been formed. The association has already aroused a great deal of interest and it is highly probable that the people of this township will vote a special tax for roads. In Lexington and Conrad Hill townships in the same county an association has been formed known as the Holly Grove Good Roads and Agricultural Association and this association has secured contributions sufficient to build a King road drag and is at work improving the dirt roads of the neighborhood.

Dallas county, Texas, is famous for its good roads. Recently fifty representative citizens of Celina and surrounding territory, under the auspices of the Celina Commercial Club visited Dallas county in automobiles and inspected the good roads of the county with a view of interesting their own county (Collins) in better roads.

Polk county, Fla., is considering ways and means of raising \$400,000 for the building of permanent hard roads. At a meeting held at Mulberry, Fla., recently the matter was thoroughly discussed by delegates from every part of the county and it is probable that a method will be devised by which half of the amount will be raised by issuing bonds and the remainder by direct taxation.

Waycross, Ga., is asking for bids on concrete street paving amounting to about 10,000 yards.

Buncombe county, N. C., wants to issue more bonds for roads, the proposed issue being \$100,000. Fairview township, in that county, recently voted \$30,000 in bonds for roads but the bonds have not been issued and if the county issue is secured, the roads of this township will be built by the county, thus saving the taxpayers of Fairview the expense of purchasing road machinery for their comparatively small amount of work.

At Mendenhall, Miss., a few days ago the county road supervisors met and disposed of the \$40,000 bond issue for roads. These bonds bear 5 per cent and will mature in twenty years. Work on the roads will begin at once.

The board of commissioners of Duval county, Fla., are advertising for bids for the completion of a portion of the famous Mandarin road and for the construction of a concrete bridge on the same road.

It was announced recently that the River Road from Dublin, Ga., to the Montgomery county line is to be plowed at once. Convicts will do the work, one gang being put at the road work and another at the work of rebuilding and repairing the eleven bridges along the road.

It is estimated that the state of Illinois is spending more than \$6,000,000 annually for road improvement.

The Kay county, Okla., good roads association held its annual meeting at Blackwell, Okla., February 15. It was largely attended and every enthusiastic.

The state of Pennsylvania is considering the question of building 5,000 miles of good roads at a cost of about \$50,000,000. The legislature is wrestling with the problem.

Upson county, Ga., took a long step backward February 15 when the bond issue for improving the exceedingly bad roads of the county was defeated.

The Franklin county, Ga., Good Roads Association was organized at Carnesville last month with the following officers: President, Dr. S. B. Yow, of Lavonia; Vice-Presidents Dr. J. R. Hall, of Carnesville, Hon. B. L. Bond, of Royston, and Hon. E. W. Coker, of Ashland; Col. D. T. Davis, of Lavonia, Secretary.

The Young Men's Progressive League, of Jacksonville, Tex., has started a good roads campaign that promises to be interesting. They are now arranging for an election to be held in the Jacksonville justice precinct.

At Hamilton, Ga., good roads enthusiasts, growing tired of waiting for the authorities to improve the roads, started a fund to buy road machinery. A little more \$250 was raised the first day of the canvass and there in every reason to believe that a sufficient amount will be raised to accomplish real good.

Governor Dongahey, of Arkansas, advocates a tax levy for roads of one half mill on the part of the state, a county of two mills and a township tax of one mill. This will raise annually \$500,000, enough to pay one fifth of the cost of every first-class road built in the state. He also advocates the use of convicts on the public roads.

Valdosta, Ga., one of the liveliest little cities in the wiregrass section, is pulling for the National Highway, the New York-Atlanta road that is to be extended from Atlanta to Jacksonville.

James City county, Virginia, and the town of Williamsburg, have pledged \$2,500 for the Richmond-Newport News highway which is being promoted by the Virginia Peninsula Highway Association.

Tazewell county, Va., is on the eve great development. No county in Virginia is more favored as far as natural resources are concerned and now it has determined to issue bonds for \$600,000 for a modern system of roads. The issue has been divided up among the districts of the county, each district voting on the amount it desires to issue.

Wise county, Va., which voted bonds for \$400,000 for roads has begun work on its road system.

At Webster City, Iowa, a good roads rally was held February 15, followed by a big banquet. There were more than 200 at the banquet and the good roads cause was given a decided impetus.

Six townships in Marshall county, Iowa, have adopted the King road drag for their dirt roads as a direct result of the good work of the Marshalltown Good Roads Club.

Trinity county Texas is considering the matter of issuing bonds for \$150,000 for improved roads and the levying of a special tax of 20 cents on the \$100 worth of property to take care of the bonds.

D. Ward King, of Missouri, famous as the originator of the split-log drag, is busy making good roads speeches in all parts of the country. He addressed 500 township officers and farmers at Nevada, Ia., recently.

Sumter, S. C., has voted bonds for \$50,000 for paving business streets.

Precinct No. 1, Comanche county, Tex., will vote March 25 on the issuing of bonds for \$100,000 for good roads.

Granger-Bartlett justice precinct, Williamson county, Tex., will vote March 29 on a bond issue of \$100,000 for macadam roads.

Newnan, Ga., is to have an election soon on a proposition to issue \$50,000 of bonds for street work.

Frio county, Tex., holds an election March 25 to decide on a bond issue for roads.

Mobile, Ala., has awarded contracts for street work amounting to \$64,000.

Fayetteville, N. C., is preparing to spend \$35,000 for paving.

Boonville township, Yadkin county, N. C., contemplates issuing bonds for road improvement and is carrying on a campaign to that end.

Toombs county, Ga., will issue \$200,000 of bonds for good roads.

Forsyth county, N. C., which already has considerable mileage of good road, will issue bonds for \$750,000 for further construction.

Annapolis, Md., is asking for bids for paving four streets with tar or asphalt macadam.

Norfolk, Va., will spend \$137,000 in paving Church street.

Yadkin county, N. C., is preparing to start systematic road improvement in the county by building a macadam road from Yadkinville to East Bend.

Russell county, Va., carried the \$275,000 bond election and will begin building good roads soon.

BRIDGES AND CULVERTS

The county commissioners of Dallas county, Ala., have contracted for the construction of 23 steel bridges at a cost of \$33,313.

Clinton county, Ala., will let a contract this month for the construction of a steel bridge with two 110-foot span and 45 and 60 foot approaches.

Kansas City, Mo., has let a contract for the construction of a concrete arch bridge across Blue River costing \$60,318.

Mecklenburg and Gaston counties, N. C., are preparing to construct a bridge across the Catawba river. It will cost about \$35,000.

At Guthrie, Okla., a viaduct is to be constructed across the railroad tracks and the Cottonwood river. It will be 800 feet long and will cost \$500,000. The city will pay only a small part of it—the balance coming from the Gulf, Colorado and Santa Fe railroad, and the Guthrie Street Railway Co.

Memphis, Tenn., is to construct 400 linear feet of concrete culvert on one of its principal streets.

The railway company entering Memphis, Tenn., with their lines are combining to build a steel and concrete viaduct 955 feet long.

Danville, Va., is planning to build a concrete bridge across the Dan river at a cost of about \$40,000.

Brunswick county, Va., is asking for bids on a steel bridge 285 feet long.

The commissioners of Jefferson and Hardin counties, Ky., have completed plans for the construction of a bridge across the Salt river at West Point costing \$70,000. It is to be built of steel and will have concrete floor.

McCracken county, Ky., will construct twelve bridges during 1911. All are to be of steel with concrete floors.

Choctaw county, Okla., will vote in May on issuing bonds for \$125,000 for the construction of a number of bridges.

Riehland county, S. C., votes this month on a bond issue of \$75,000 for the purchase of the present bridges or the building of new ones across the Congaree and Broad rivers.

Menard county, Tex., has voted bonds for \$20,000 for the construction of a bridge across the San Saba river.

At Petersburg, Va., a contract has been let for the construction of a concrete viaduct across Lieutenant Run, 600 feet in length and costing \$30,000.

At Richmond, Va., a contract has been let for a bridge across the James river connecting Westhampton with Chesterfield county. The bridge is 950 feet long and will cost \$50,000.

St. Augustine, Fla., is asking for bids for the building of a concrete bridge across the San Sebastian river.

Lampasas county, Tex., will vote on the issuance of bonds for building a bridge across Lampasas river.

Smithville, Tex., will vote soon on issuing bonds for the building of several bridges.

Wichita county, Tex., will build a wagon bridge across Wichita river at a cost of about \$15,000.

At Richmond, Va., the Richmond & Henrico Railway company will build a viaduct connecting the National cemetery road and Fulton, to cost \$150,000.

Montgomery, Ala., is preparing to build a reinforced concrete bridge on Ripley street, eighty feet long and forty feet wide.

Two steel bridges are to be built across the Missouri river at St. Louis by the St. Louis Electric Railway company.

The St. Louis and San Francisco railway will build a 1000-foot viaduct across Otey avenue in Memphis, Tenn.

Nashville, Tenn., is preparing to issue bonds for \$100,000 for widening the bridge on Charlotte avenue and making other improvements.

A steel bridge is to be built across the Eastern Branch connecting Norfolk and Berkley, Va.

Additions to the Legislative Committee of the Southern Appalachian Good Roads Association.

The following members of the Southern Appalachian Good Roads Association have been added to the legislative committee, which was recently appointed, and the names of which were published in the January number of Southern Good Roads: J. W. Huff, Castlewood, Virginia; John L. Patterson, Roanoke, Rapids, North Carolina.

There was a meeting of the rural free delivery carriers of Forsyth, Davie and Stokes counties, North Carolina, in Winston-Salem on February 22. A permanent organization was effected and the assembled carriers went on record as favoring good roads. The association passed resolutions endorsing the good roads law prepared by Dr. Joseph Hyde Pratt, state geologist, and the free use of the split-log drag. Every carrier pledged himself to work among patrons of his route in the interest of road improvement and especially to secure the use of the road drag.

McCulloch county, Tex., will vote on March 25 on an issue of \$75,000 of bonds for road work.

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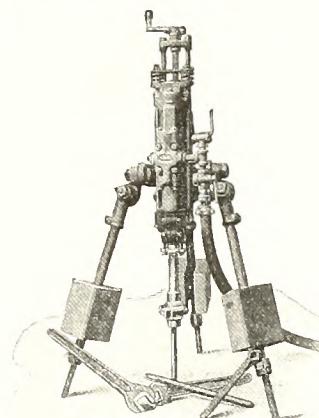
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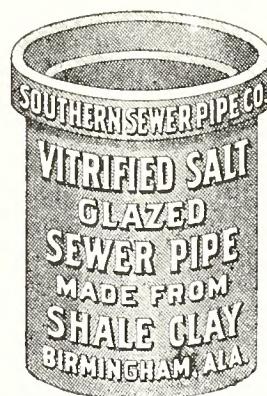
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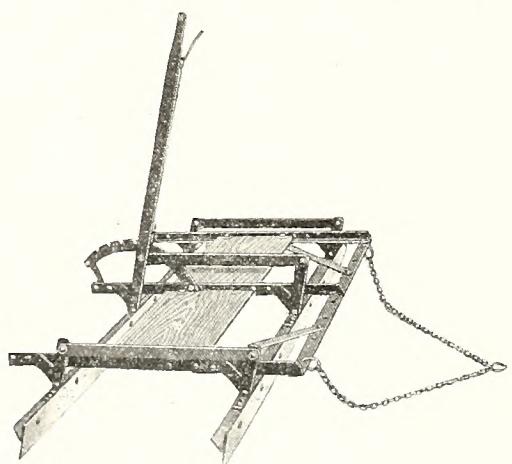
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State Highway Commission and Trunk Lines

By MAJ. W. W. CROSBY, Chief Engineer State Roads Commission, Baltimore, Md.

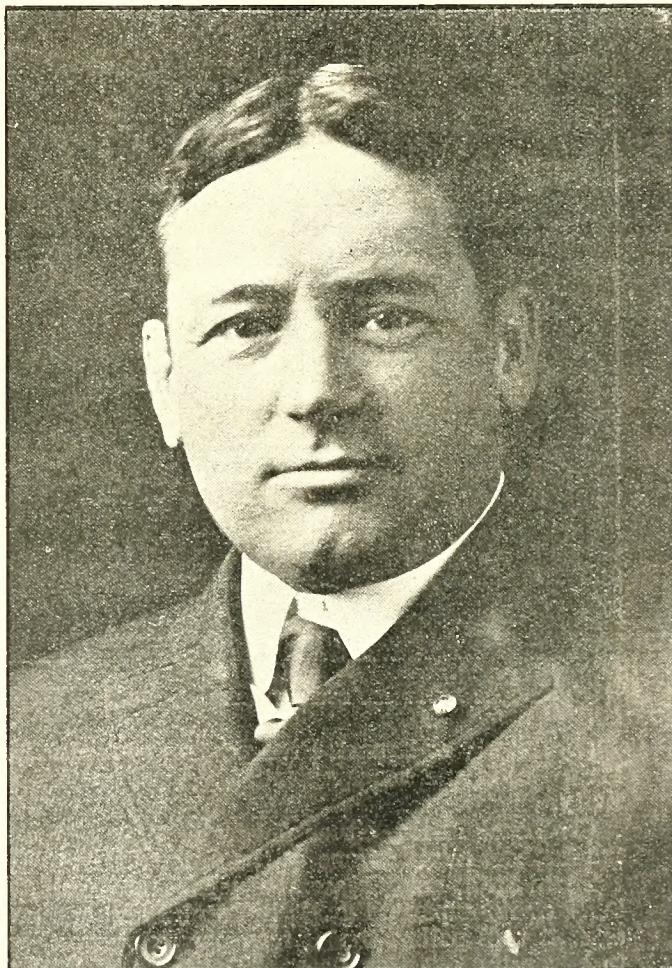
"Way down South in the Land of Cotton," there is an awakening, a movement indicative of returning life and consciousness. The sleeping beauty seems about to arise, refreshed, invigorated, and to exhibit to the world her power, her goodness and her loveliness.

The south is gigantic in natural resources and potentialities. In the development of these resources, in the enjoyment of them, and in the fullest realization of the potentialities, no one factor, can be of greater importance than "Good Roads." Perhaps right here, the expression "Good Roads" should be defined. By "Good Roads" the speaker means neither roads simply passable at all seasons and in all weathers, nor does he mean wide boulevards with the highest type of road surface (such as is necessary for intense automobile traffic) grid-ironing the country. What he means by "Good Roads" is a system of roads efficient for the demands on them and economical and satisfactory under such demands. According to the needs of the occasion, therefore, will the determination be made as to the amount of grading to be done; the kind and width of the road surface; the attention paid to appearances, shade trees, etc.; and the expense to be incurred for all these things. If this determination is intelligently and scientifically made and then the work itself economically carried out, the Best Roads will then be had.

It will thus be seen that a number of complicated problems calling for skill, experience and education for their solution, are involved in the question of getting the good roads needed for the proper development of the south, or of any state. The securing of men with the necessary qualifications for the proper results is too difficult a matter usually to be safely left with a locality, such as a town or a county. The state itself is the proper unit for taking charge of such work. The speaker is well aware that there are apparent exceptions to this rule but in his judgment, the cases in mind only "prove the rule." Further, beside the ability of the state to secure better handling of the work, the interests of the sub-divisions of the state are the interests of the state, and the interests of the state, as a whole, must outweigh the interests of any of its parts. Proper consideration must, and eventually will, be given to the interests of the locality, but the interests of the different counties and towns of a state are so intermingled that a proper consideration of all is only had by the state.

Again, the old theory, or practice of it, that road improvements must be made and paid for by the properties fronting on the section of road itself, or, at most, by those immediately connected with it, has

been so thoroughly exploded and shown as false that it would scarcely be worth while to refer to it here, except to call attention to another reason for state control and to show the possibility, by state control and aid, of securing proper assistance toward Good Roads from those perhaps first and most benefitted—



MAJ. W. W. CROSBY

the inhabitants of the larger towns and cities of the state.

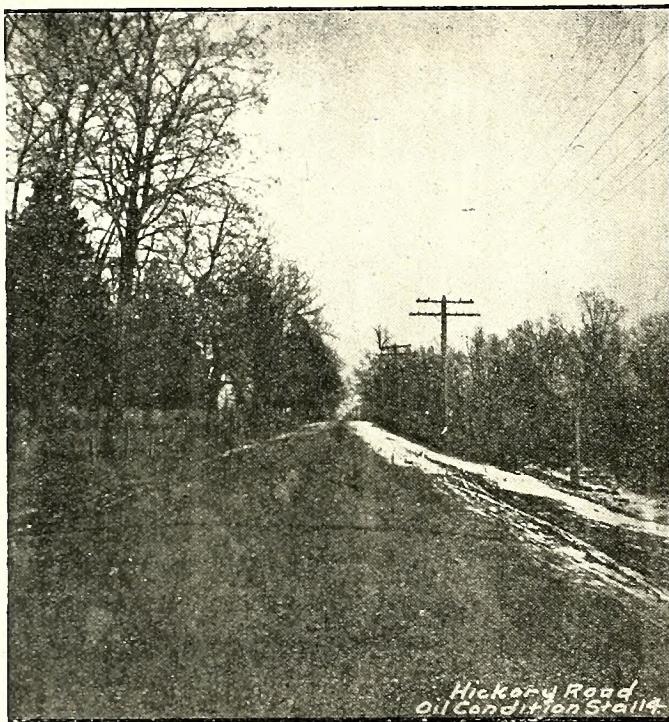
The propriety and desirability of efficient State Road Commissions will, the speaker believes, be apparent from the above suggestions. Of course, it is to be supposed that such state commissions will be efficient and enthusiastic for the best results, not simply Bureaucrats.

The next step for Good Roads is the provision of funds. The speaker firmly believes, to be brief, in bond issues for purposes of construction, with the distinct understanding that the life of bonds shall be less than the probable life of the road and that clear provision shall be had for the proper maintenance of the road, after construction, with funds from the annual tax levies or license fees.

The next step is the selection of the routes for improvement, which perhaps may be the most troublesome of all. Individual, local, political and other considerations are bound to be pressed forward and even a state commission will find difficulties in convincing all of its soundness of judgment in such cases. The majority of them, however, have seemed to meet the demands fairly well, and, in most cases, there has been recognized the following:

The public roads of a state may be divided into three classes, viz:

(1) Main Roads or Trunk Lines connecting with other states and connecting the different centers of the state itself.



A Typical Good Road Between Baltimore and Philadelphia

(2) County or Branch Roads acting as feeders to the Main Roads and reaching into the local centers of activity.

(3) Local Roads, either purely local or at the most the farthest ramifications of the County Roads.

There are so many reasons why the state itself should build at its expense the Main Trunk lines, and so few against that policy, that it may hardly be worth while to argue the question here. The importance of these roads to the state as a whole; the magnitude of such work; the character of the construction needed, the necessity for keeping up to the times in it; the general benefit to be derived from its proper prosecution and completion; the need for an established systematic policy in this connection; the unlikelihood of any county's being able to meet these demands as well as the state; all make it imperative for the latter to perform its duty in the matter.

The importance to a state or to this entire country

of ours, of a properly built and maintained system of Main Trunk Lines or Main Artery Roads can hardly be over-estimated. Their value was beginning to be appreciated about one hundred years ago when even national appropriations were actually made for their establishment. Then came the development of the steam railroads (and later of the electric railroads) which temporarily at least diverted the attentions and energies away from the highways. And the vastness of area of our country, its rapidity and diversity of growth and of development aided in advancement of the railway side of the matter.

Now the highway seems to be coming in for its own again. It has begun to be realized that the railway cannot supplant the highway; that railway advantages depend largely on, and are enhanced by, proper highways rather than suffering injurious competition from them. Even Main Trunk Lines of Highways would, the speaker firmly believes, be advantageous rather than otherwise to the railways traversing the same sections. There is acknowledged need for greater efficiency on the steam railways and the speaker believes that such can be aided by the establishment of systems of Main Artery Highways, and the transference to them of a portion at least of the local freight and passenger traffic—now a serious burden to many steam railways—without loss, if not with actual profit to the railway.

An additional value of the highway world, of course, be from its aid in the development of the country and from its convenience. Since the advent of the motor-vehicle, and of its prospects for great future development for freight as well as passenger service, a strong further argument along these lines has been furnished. The American visitor to foreign countries is surprised at the use made of motor vehicles abroad and is impressed with the enormous advantages had thereby. Such use and advantages are possible because the Main Trunk Lines of highways exist. They existed there before the railways were built. They should exist here at the earliest practicable moment.

There is another point the speaker wishes to suggest here, concerning State Highway Commissions and Main Trunk Lines—a point, which is of the utmost importance though it may be considered neither an economic nor a scientific one. Yet if, as has been said, "Engineering is the art of using the forces of nature (including Human Nature) for the benefit of Mankind," possibly the speaker may be permitted to offer it. It is this; the State Commission can, and should, set the example. A good object lesson road is worth a hundred arguments or a thousand threats or compelled results in the general movement for good roads, whether county, state or sectional.

Up to the present time in this country it has been found that a satisfactory Main Trunk Line system of state roads will embrace from eight to twelve per cent. of all the public road mileage of the state. Of course the lines of division between the three classes of road mentioned are not always clear and naturally from time to time, as the state or locality develops or changes, a transfer from one class to another may be demanded. For the present, it may be safely assumed that the second class (County or Branch Roads) will average to be in mileage between two and three times as large as the first class, so that the first and second classes will include not over fifty per cent. of the total mileage of the state, the remaining half being the local roads.

If now, the state builds and maintains the first class, it would seem fair and proper for the counties to contribute toward the expense of the second class and, with the localities, to assume the entire expense of the

third class, especially when it is remembered that the cost of a mile of first class (Main) road is likely to be equal, or nearly so, to that of from two to three miles of second class (Branch or County) road. In order however, to make up for the lack of definiteness in the division between the first and second classes; to more equally distribute the burdens of the work; to secure desirable uniformity, efficiency, and provision for future changes in class; and to encourage the counties to proceed with their part of the general work for improvement, it is advisable for the expense of construction of the second class roads to be shared by the state. The extent of such sharing will be governed by proper consideration of the relative abilities and interests of the counties and towns or cities of the state; their geographical positions, areas, population, resources, etc. Further, the state's offer to share must be at least sufficient to induce co-operation on the part of the counties. Suffice it to say it will have to be probably between 25 and 50 per cent. of the total expense of the work.

This state-aid plan of caring for the improvement of the second class of public roads is one of the most effective yet devised for securing better roads. By its co-operative and educational features, it supports the plan for state construction and maintenance of the first class roads and induces, as well as supports, better work by the local authorities on the third class roads, as well as on the second class roads themselves.

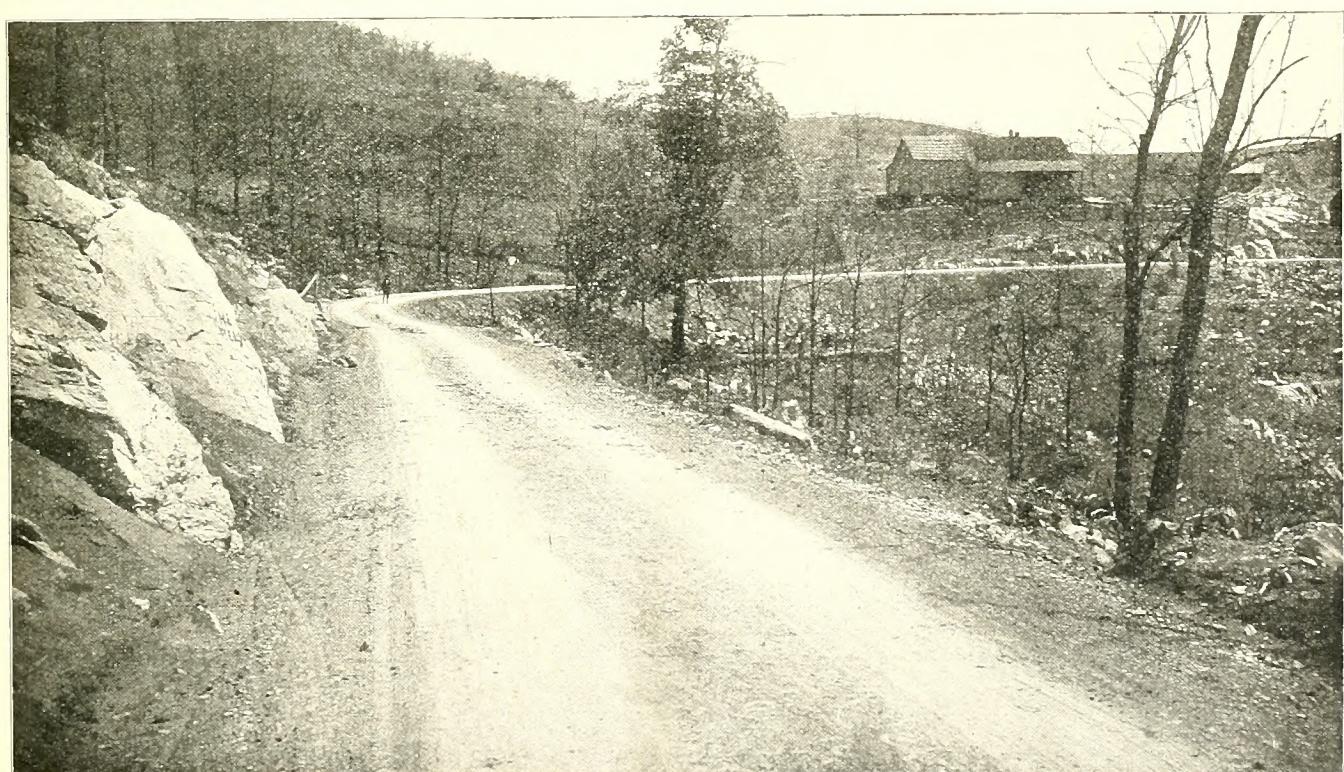
It is proper and desirable for the state to control the maintenance and construction of both the state and state-aided roads, though, in the latter case, it is frequently more fair for the expense of maintaining the state-aided roads to be borne wholly, or largely, by the counties. And the speaker wishes to make the point here that no movement for good roads should be undertaken without proper consideration for the maintenance side of the matter, nor should a good roads law be passed that does not provide clearly for the proper maintenance of the new roads after they are once built. Generally too, this maintenance should not come out of the bond issue, but from the annually

levied funds for such purposes. And when it is recalled that, as has been stated by the speaker, at least fifty per cent. of our public roads can expect nothing but maintenance for a considerable future, the importance of this feature is realized. A great deal of harm has been done the good road movement by an unfortunate selection of the term "permanent" roads to indicate modern road work. What was evidently intended was to express the condition of the new road surface to be expected throughout the twelve months of a year. It has, however, too frequently been interpreted to mean a road that would need no maintenance. Such an idea is "a delusion and a snare." It cannot, in the nature of earthly things, exist. The maintenance by proper planning can be reduced to a minimum, but it can never be wiped out entirely. The most that can be hoped for is to have it, and our road work generally, up to date.

In Maryland, we think we are up to date on the road question. We have had a state-aid law dating back to 1898, and furnishing financial as well as technical aid in road-building to the counties since 1905. At least 200 miles of state-aided road have been built under it. Since 1908, we have had also a state road law, providing state loans of \$5,000,000 for the improvement of the main roads by the state itself. Under this latter law, a Main Trunk Line system of about 1200 miles has been selected from the 16,000 miles of public road in the state, and nearly 150 miles of the system have already been built. In addition a number of our counties have themselves carried on similar work on their own accounts.

We believe that the work so far done in Maryland will compare favorably in character and up-to-dateness with that elsewhere, and we hope to be able to hold our own in this matter.

If, from what has been stated by the speaker, any assistance has been given to any of you, or any benefit is to be had by those who have listened so patiently, the speaker is delighted. Maryland offers to you all, and to her sister states, her best wishes for "Dixie."



Section of Macadam Road Between Bluefield and Princeton, West Virginia

Permanent Maintenance and Skilled Supervision of Roads

By HON. CURTIS HILL, State Highway Engineer, of Columbia, Missouri

It requires three things to make a great country; the right kind of people, productive lands, and means of communication and transportation. Fix your attention upon the road question from the standpoint of communication and transportation, with the highway as an important part of the transportation system. Draw a mind sketch in which imagine yourself making a large map of your state. On this map draw lines representing the railroads and mark the tonnage of freight carried by them. Then draw a second set of different colored lines representing the waterways and mark the tonnage of freight carried by them. In still another color make a third set of lines to represent the public wagon roads and mark thereon the tonnage of freight moved over them. Note the comparison in tonnage transported and you will see that the proportion moved over the highways, originating in the state, exceeds either of the others. This map will also show

one section rock construction is best, in another gravel and in still others sand-clay or chert. A special feature in some counties is the well dragged earth road, while in others concrete or masonry in culverts or bridges may be pre-eminent. It is necessary for the highway engineer to study the field and choose the methods, plans, and materials adaptable to the locality.

Supervision.

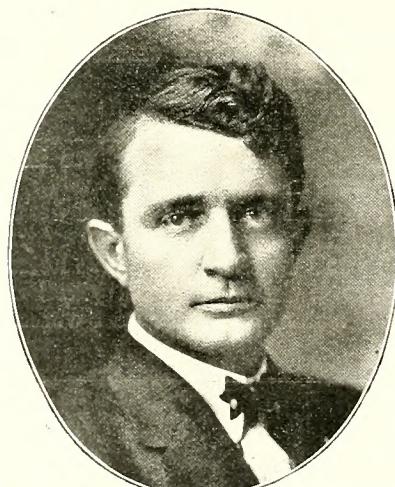
For practical consideration we may divide road administration into two parts, namely: Revenue and Expenditures. Placing under the term "revenue" that part which has to deal only with measures for producing and collecting the means for carrying on the work and under "expenditures" that providing for the execution of the actual work. The most important part of the execution of the actual work is supervision. The advantages of skilled supervision of highway work are:

- (1.) Organization—a perfect system in every department of the road work.
- (2.) One man with authority to direct in whom responsibility can be fixed.
- (3.) Raising the standard of road work and conducting it upon a uniform and business like basis.

Organized, systematized work prevents waste. Well organized, systematical work is impossible without competent and trained supervision. Trained supervision is the correct principle with which to carry on any business. "Regular" might be substituted for "trained" because if a road official is found to be suited for the work and is retained regularly at his work he becomes a "trained or skilled" road man. Engineers should be retained because road work is more nearly engineering construction than any other one thing and the general training of engineers fits them for road work. It makes but little difference whether that engineer got his training for a road engineer on the farm or in or out of college so long as he has it. Road engineering is no more nor less difficult than any other kind of engineering. There is nothing mysterious about it. It is observing, following and controlling natural laws.

There are over 100,000 petty road officials in the United States. Without any reflection upon these individuals, there should be some central authority, not leaving each of these men to work out his own peculiar ideas regardless of general results and of surrounding communities. A competent man should be at the head of the road work of each county and a state department with the best facilities possible should aid and direct the whole. One argument favoring state aid is that it permits a partial state supervision and thereby better supervision than is usually obtained through local influences. The general trend of road legislation is for cash taxes, state aid and skilled supervision.

A county judge or county commissioner is not elected because he is a dentist, a lawyer, a stone mason, a road builder or a skilled artisan of any particular kind but because he is a good citizen and has sound judgment upon affairs in general. The county judges or commissioners, invariably men of good character and standing in their communities, cannot, as a rule, as individual members of the court, supervise the ac-



HON. CURTIS HILL

that while the railways and waterways touch upon some farms and communities, the highways reach them all. Then is not the highway an important factor in the system of transportation—as important as the railway or waterway. It requires them all, highway, waterway and railway to make up the complete system of transportation and the very basis of this transportation system is the highway. The commercial greatness of the south cannot be built upon a firmer foundation than good highways.

If we assume that road building is to make use of natural materials in such a manner as to produce the improved road and that the roads should be built to meet the needs and the demands of travel coming upon them, it follows that all the roads should not be rocked, graveled or oiled, neither should all be of earth. Many of the states have such a diversity of road making material that no one method or plan of construction is adaptable in all parts of a state and plans must frequently be varied over one county. In

tual work, draw plans, make estimates and look after this part of the county's business. There should be a county highway department in every county of every state with powers for execution of the actual road work, unhampered by courts, boards and commissions. The official of this county department should have authority to act upon his own initiative, be free to carry out his own plans and details of his work and should receive remuneration in accordance with the importance of the work and skill required.

A capable man in such an office will see that the work is done right, protect the county against unscrupulous contractors, open the road drains and prevent the roads from being used for artificial farm drains, cut the hedges, clear obstructions from the right-of-way, create a wholesome respect for the roads and the road laws, assist in correction of the road records, know how many tools and implements the county owns, know how and where the road money is spent, regulate accounts and avoid excessive bills, be an aid to the overseers and build up a road working and maintenance system and organization. A thousand small details can be attended to—things small in themselves which any man of good sense can do but are otherwise left undone simply because it is nobody's business, in particular, to look after them. The cost of such supervision of the road work of a county is money saved and not money lost, and if any county does not improve road conditions under it, it is the fault of the county and not of the law. The county must get a man competent to fill the position—the law cannot legislate brains into men.

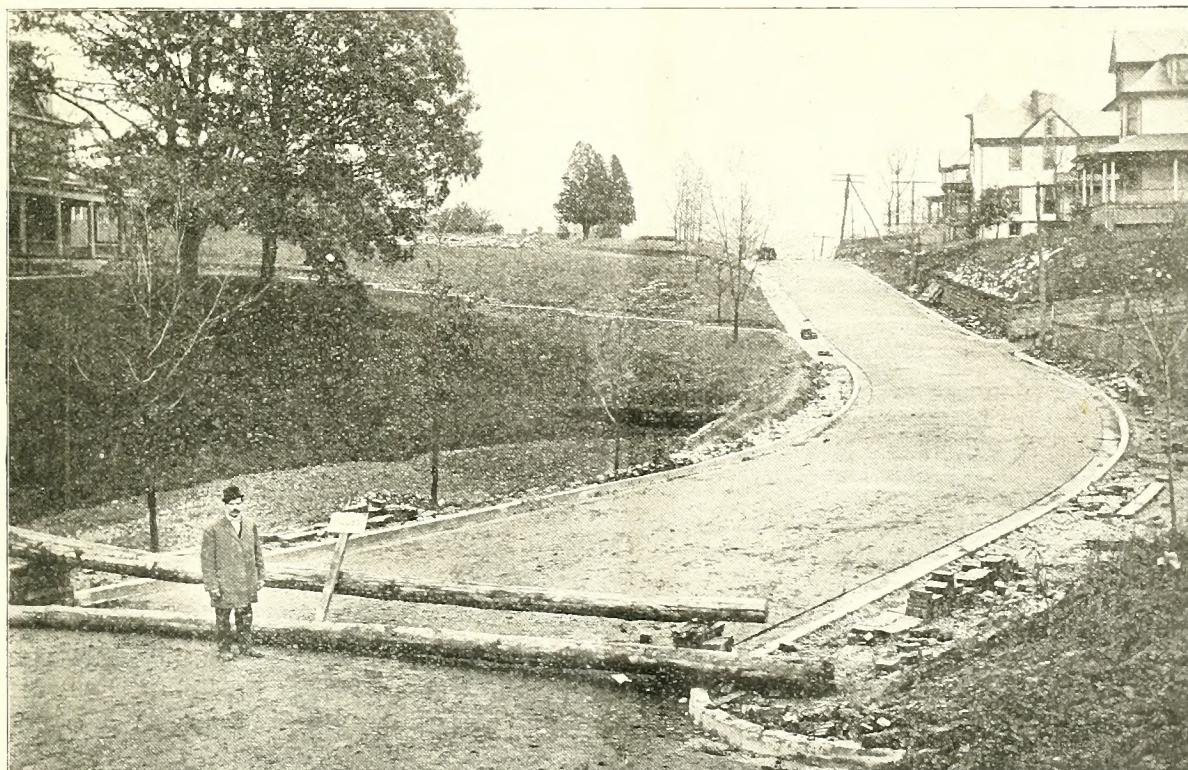
There are two things every man thinks he knows how to do—one is to build a road and the other is to judge a gold mine. The road work can never be successful while it is a side business for everybody. Men must attend to their own individual business upon which their living depends and they are usually too busy at that to properly attend to road affairs. As a general rule a man must give some one thing his time

and attention to become trained or skilled. In every community somebody should be trained for road work and kept in charge of it while the other people are attending to their own individual affairs. It is slowly being recognized that every man is not a born road builder, and the sooner the roads are put under trained supervision the better it will be for the roads.

Take for example the state of Missouri where the laws for state and county highway engineers became effective four years ago. Among other things these laws require each overseer to make a monthly itemized statement to the county engineer and a full settlement every three months. Prior to these laws the overseers made an annual settlement with the county comts. Many such statements were received, accepted and filed as the following:

Received \$224.00	Spent \$224.00
Or, the following true copy of a settlement:	
Roat work on Roat	
Teastrick 15	
Took up one Colbart ant bnt him bake	
ant the work a mound to \$600.00	
ant 2 joint of 12 in Tile at 65 pease	
ant Fraite wase 25e	
ant Fraite ant all amount	155
	600
	—
	7.65

Compare these statements with those now made to the county highway engineer which contains the date when funds are received, from what source received, amount expended and where and how spent. In some counties the engineers have effected a saving of twenty per cent by regulating the purchase of implements and materials. In one instance the county engineer found that only about ten per cent of the district road funds of one district was reaching the roads. A ninety per cent loss, not through graft, but by slack methods. In culvert work, for example, one of the engineers, upon taking the office found a contract for



State Aid Work, Monongalia County, West Virginia

\$125.00 worth of lumber to bridge a branch. He cancelled the contract and put in a concrete culvert with sufficient waterway for \$25.00. In an examination, on one occasion, for improving $\frac{1}{4}$ mile of road I found one 18 inch tile culvert for a drainage area of 40 acres of land and a 6 foot culvert for 35 acres.

These are only a few examples of what may be corrected by good supervision. All names and localities are purposely omitted. It is difficult to change the customs and habits of a century but it seems that if any tax payer, in many of the states, would take a little time for investigation of road affairs he could not object to knowing that his taxes were being spent with some resemblance of skilled supervision.

Maintenance.

Good roads must not only be built, but they must be taken care of after they are built. One great defect in our road work is the lack of maintenance—more correctly, the lack of a proper system for maintenance. Traffic and the elements are continually tearing the roads down, we must be continually building them up. A small hole soon becomes a large one, and the road bed can be kept smooth only by constant care and attention. The crown must be kept rounded, the growth of obnoxious weeds and brush kept down, and the drains, ditches and culverts be kept open and in repair. Nothing short of constant attention will do this. It is this constant attention necessary to the proper use of the drag which makes it one of the best and most economical implements with which to maintain earth roads. The drag is simple, effective, cheap—and fool proof.

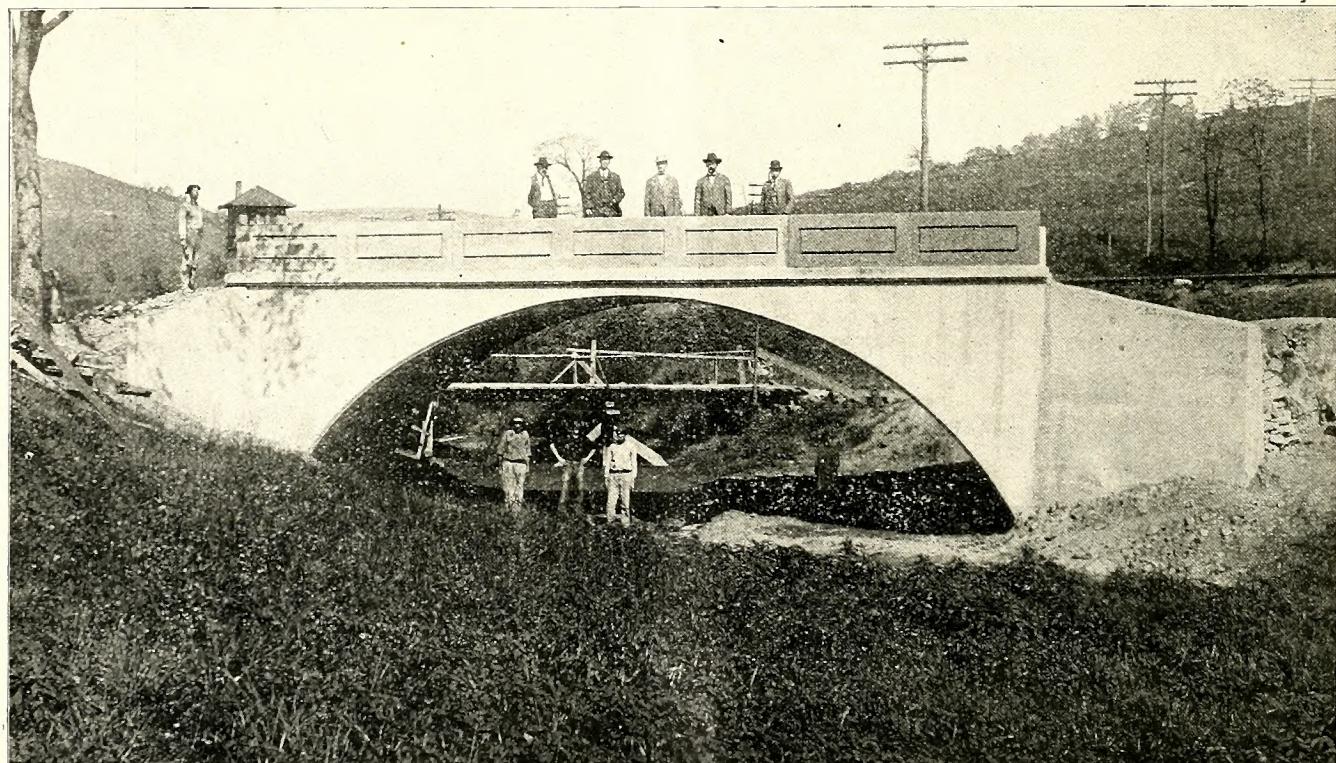
Any kind of a road gradually wears out and this loss must be replaced or the road will gradually go down. The old adage is true that "a stitch in time saves nine." Any road of good material will become unevenly worn in a few years and it is then necessary to add new material, if it has not been added continuously during the time of wear. In any event the con-

tinuous maintenance system is advantageous over that of any other. The system of going over and repairing the roads once a year or once every few years is not maintaining but it is rebuilding. There are seasons of bad weather and initial destruction when a one man patrol of our roads would be more effective than any other method. The road district should be of suitable mileage to employ an overseer by the year. During rainy seasons, the winter months and at all times out of the actual road working season this overseer, provided with the necessary equipment, should patrol the roads under his care. This overseer under the direct control of the county supervisor who in turn has a state highway engineer with whom to consult and advise would constitute an economical and effective organization and working system for road building and maintenance. A working organization whereby any community may acquire permanent maintenance and skilled supervision of roads.

Good Roads Cost Money.

Prescott Spectator (Prescott, Washington): "Most people look upon the question of good roads as an abstract proposition, good to talk about, but a poor thing to pay for. The average man will howl his head off about the miserable condition of the roads, but ask him to pay for making them better and his howl is changed to a whine; it's sort of human nature to want things for nothing, don't you know? In the opinion of many men in these later times, however, good roads are something worth having, and sometimes worth paying for. They are not considered as much of a luxury as a necessity and an economy."

Now for good roads and other developments in the way of public enterprise, and lets have some "stirrup" as well as "catchup" in Obion county.—Union City (Tenn.) Commercial.



Re-Inforced Concrete Bridge. Clear Span Thirty-Eight Feet, Fairmont and Beverly Pike, Taylor County, West Virginia

The First Sand Clay Road

By MR. I. E. WATSON, Florence, South Carolina

I claim the unique honor of being the first man in South Carolina, and, I believe, the first man in the world to build a sand-clay road for which service I was indicted in the criminal court, tried and convicted. The people whom it served in Marion county, S. C., twenty years ago, did not think highly of my road and were slow to accept it. Today Marion county has bonded itself for \$100,000 to build sand-clay roads. The United States government is sending its experts all over the nation, teaching the people how to build cheap sand-clay roads. The method is destined to prevail all over the country. It was only ten years ago that the government got on to the advantages of the earth road and at that time the leading road authorities of the country gave it as their opinion that work on earth roads was worthless and was money thrown away. All that is changed. But, to my experiences as a pioneer—

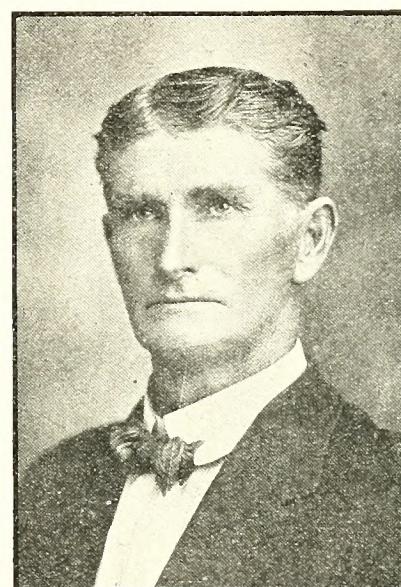
More than twenty years ago I built the first sand-clay road in Marion county, S. C. It was called sand-clay because I dug up the clay and hauled sand to build the first road of this kind in the county. The road was built on a very boggy place which was almost impassable. It was kept just barely passable by digging long ditches on each side of the road and carrying off the water. These ditches, owing to the lay of the land, had to be very long, emptying into a creek a considerable distance away. The road was then corduroyed with rails, poles and puncheons, with turf, mud and whatever could be found packed in between. It was noted as the worst piece of road in Marion county, hardest to keep up and most unsatisfactory all round. In the campaign before the election I had stated on every stump in the county that I could build a good sand-clay road wherever I could get a good quality of sand and clay. I had discovered the method myself and felt sure that it would work anywhere, because it was sound in principle.

The election came off and I won. This particularly bad stretch of road was selected for the trial of the sand-clay method, and a worse subject for treatment could not have been found in the world. It was considered an "impossible" place and there was much open scoffing and skepticism. I tackled this road, however, confident that I would win out and began by pulling out all of the poles, rails, puncheons and other corduroy material. Then, by throwing up clay from the sides of the road I got the road in shape, properly crowned, and began hauling sand to put over the clay. I worked it in and then hauled still more, thus raising the road high in the middle. The foundation, owing to the boggy condition of the locality, was a wet, springy clay. When the first rain came trouble came right along with it, and worlds of it. My road from one end to the other became a perfect mortar bed. The road has been well nigh impassable before and it was completely so now.

Then came the indictment. The citizens who had the misfortune to be compelled to travel that road were up in arms. A more indignant set of good people never appealed the courts of South Carolina for redress. The grand jury met and returned a true bill against me, charging that by improper methods of road building that I had destroyed one of the public highways of the county, "against the peace and dignity of the state and the statute therein made and

provided." My case came on and everything went against me. The judgment of the court was that I must put the road back like it was before and it was so ordered. In the opinion of the court, it was best to choose the lesser of two evils. The old road was bad and the new one was much worse. Another feature of the judgment of the court was that I should put the road back as I found it at my own expense.

But, I never did a thing to that road. Fair weather came and it dried off and was in fine condition. There has been no necessity to do anything to it since and I have a photograph of it now showing it to be in fine condition after twenty years of continuous service. Just before another court came round the people petitioned the court to not have the road I had built changed and to allow me to make another demonstration of the same kind. In their petition they stated that the road was in better shape than it had



MR. I. E. WATSON

ever been before. The judge in granting the petition, said that I was the first man to be brought before him for working the road, though many had been brought before him for not working the road and he said that I should certainly be allowed to build other roads of the same kind.

Understand, that I did not pitch in and do this road building along such new and radical lines offhand. It had all been carefully planned and worked out and I had experimented carefully for years. I knew what I was about and even when things seemed to be breaking against me, I never lost faith in the method. I first noticed the effects of combining sand and clay in building a mill dam and I followed it up until I was certain that the system would make good in road building. I had no precedents to guide me and every road-building authority in the land was against me and I had to strike out alone.

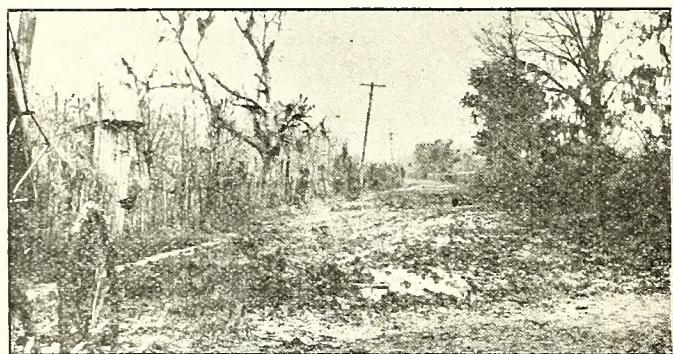
It may well be believed that the system created a commotion in Marion county. The event will go down in history as one of the liveliest periods of the county's history. Friends, relatives, members of the same fam-

ily, societies and churches were divided on the question. Some thought that I was crazy and said so openly. Others said that I was born fifty years ahead of my time and a few others thought my system practical and the thing to adopt. The fight was long and harrassing. I left the county and the report got out that I had been run out of the county because of my heretical road views. Since that time, however, the value of the sand-clay road being fully demonstrated, my friends in Marion county have insisted on my coming back to the county about every four years to do other demonstration work, until Marion county now leads the state in road building and a bond issue of \$100,000 has been voted to continue the building of sand-clay roads, the roads that I wanted to build for them twenty years ago.

Since I did this pioneer work the United States government has sent out to every section of the civilized world experts to learn the secrets of road building employed by the oldest and wisest countries in the world and to find a practical method of road building. Uncle Sam did not look for information from "away down South in Dixie," but it was here that he found it after many years' search. It has been but one decade since the discovery was made and the growth of the idea has been astounding. I have now in my possession bulletins of the road department of the United States Department of Agriculture stating that work on earth

ened things in Marion county twenty years ago.

The sand-clay road is here to stay. It is a fact that sand and clay and water are the worst enemies that a good road has to fight, when they are not mixed in proportion. When properly mixed and shaped, they make the best road in the world. It is the only road in the world that will not wear out. The more you use a sand-clay road the better it gets. Of the agencies that go to make it water is the most important and the most essential. You can make a road with mud clay and water. In short, you can leave out any other of the ingredients named and make a road, but you cannot leave out water. Moisture you must have, in order to properly combine the mass. For this reason put nothing in the road that will interfere with the work of the water. It is my opinion that the water, where possible, had best come from beneath the road for various reasons too numerous to mention here. I know that this is a feature of road building in which other road builders and I do not agree. The highest authorities, in fact, disagree with me, but I feel sure that I can prove what I say, and I will stick to my assertion that the most important feature is the control of the moisture. I venture the assertion that one half of the funds used in road building is thrown away by unnecessary ditching along the sides of the roads. The special demonstration which got me in so much trouble was done to show this very point—to prove that it could be done without expensive draining and side ditches. Now, if this same material that has been forming a good road for twenty years over this Marion county bog had been on a sand hill or in a dry place, the materials would have been dissolved, cut up and turned to dust long ago, because of the lack of moisture necessary to hold it together. The proportions put in that special stretch of road would not make a good road anywhere else. It can be readily seen, therefore, that the proportion of the various materials that go to make the road must be varied according to the amount of water that may be present. Sometimes it is proper and practical to drain, for instance, if the sand is searce and drainage easy. The man who says that he can build a good road in certain set proportions without knowing the condition of the ground over which the road is to be built and without knowing the proportion of sand, clay and water already in the soil simply does not know what he is talking about. Put him down as a fakir. He must know just what sort of top surface he is dealing with and all about the sub-grade and foundations before he can form a correct opinion as to the amount of materials needed to form a good road. If he builds a good road by any other method he does it by blind luck.



A Bad Stretch of Road Along the Proposed Gentilly Auto Course, Louisiana

roads was work thrown away and was entirely useless. These bulletins go on to tell how to build macadam road, corduroy roads with rails, poles and puncheons, the same kind of road that I had ordered thrown away twenty years before. Now the United States Office of Public Roads is teaching people everywhere how to build good roads and sand-clay roads are coming in for the greater part of their attention.

In Richland county, S. C., the county in which is situated Columbia, the capital of the state, the people caught the sand-clay idea about ten years ago and they have done fine work. They had the advantage of a number of other counties in that they had an immense revenue from eight or ten dispensaries and had the use of convicts on the roads as well. They have been doing some really fine work. The adjoining counties, Marlboro, Darlington, Florence, S. C., and Robeson county, N. C. caught on and went to work. These counties have made wonderful success of it.

In this article I have tried to state the facts plainly and simply so that the reader might have an idea of how the sand-clay system got its start and what bitter opposition it met with. I want to publish the whole story in a much fuller form after awhile, giving the origin of the system, the story of my fight for it, the orders of the court, petitions, etc., that enliv-

It is safe to say that Mr. L. W. Page, head of the Federal Good Roads Bureau, and president of the American Association for Highway Improvement, is within the mark in declaring that unimproved highways cost the country, directly and indirectly, a quarter of a billion dollars a year, and equally safe is it to say that upon no state in the union does the burden fall more heavily, in proportion to population and areas, than upon Virginia. If the people had to go down into their pockets and dig up the wherewithal to meet this expenditure, it is dollars to doughnuts that the commonwealth would have long ago had a system of good, hard roads; yet the tax is none the less a tax, nor is the burden any the less a burden, because payment is made indirectly.—Norfolk Virginia-Pilot.

Oklahoma City, Okla., has awarded contracts for \$646,000 of street paving.

How to Build a Sand Clay Road

By PROF. M. GOODE HOMES, Department of Civil Engineering, University of South Carolina

When a sand-clay road is built upon a clay sub-grade, proper drainage is one of the most essential things, for unless the sub-grade of the road is dry and firm the surfacing of sand-clay is sure to break through. Ordinarily side ditches, which must be large enough to carry off all of the water falling on the road, will be sufficient. These side ditches should be wide and shallow, rather than narrow and deep, as thus they will not be hard to keep open nor dangerous to travel. They should be from four to five feet wide and from one to one and a half feet deep, sloping three to one on the side next to the road an down to one on the outer side, and they should have outlets as frequently as possible to carry the water entirely away from the road. When the sub-grade is wet or damp most of the time, or is through swampy land, tile sub-drains should be laid in order to keep the foundation of the road dry and firm. It must be borne in mind that greater care must be exercised to keep the clay sub-grade dry and in the majority of cases of a sub-grade in sandy soil.

Preparing Sub-Grade.

The roadbed should be graded true to the lines and grades established by the engineer. All spongy material, vegetable matter, trees, roots and stumps should be carefully removed from the roadbed, and the space thus filled in with sound material, and the surface of the roadbed should be dry and the sand and clay should be ploughed and harrowed with a disc harrow to a depth of four inches until the clay is completely pulverized, and the clay sub-grade should be comparatively dry, or it will not pulverize. After this has been done the roadbed should be levelled up, and it will then be ready for the sand.

Mixing Sand and Clay.

The sub-grade is now covered with six to eight inches of clean, sharp and sound sand. (When the clay already contains much sand, the amount of sand stated above should be cut down by that much.) The sand should be spread evenly and be of a uniform thickness. To get the best results the roadbed should be dry when the sand is added, and especially should it be dry when the sand and clay are mixed, as it is very difficult to mix the sand evenly with the clay when the latter is wet and sticky. The mixing is now carried on with a spike or spring tooth harrow until the sand and clay are thoroughly incorporated and the mixture is brought to a state of fine sub-division. The roadway is now shaped up with road machine, (a split-log drag may be used,) the crown being at least one-half inch per foot of half width of the road, and thrown open to traffic. From now until the surface becomes thoroughly consolidated the greatest care should be exercised to keep the surface smooth and properly crowned, and for at least a week the surface of the roadway should be reshaped every morning with the road machine, for if the roadway is worn into ruts at first it is a hard matter to ever get a smooth surface. At first the roadway will get muddy and sticky after each rain, but this is a natural consequence, become thoroughly consolidated. If an excess of clay work to the surface and makes the roadway sticky, more sand should be added until the trouble ceases. On the other hand, if the roadway is too sandy, it is best to let it alone, as this trouble will adjust itself.

Sprinkling and Rolling.

As pointed out in the last article, if it is desired to consolidate the surface at once, as soon as the sand and clay are thoroughly mixed, the roadway should be sprinkled and harrowed until the sand and clay are worked into a mud of homogeneous consistency. As soon as it has dried out sufficiently, the surface should be smoothed with the road machine and given the proper crown. And just before it becomes entirely dry it should be rolled until it becomes hard and ceases to show the tracks of ordinary loaded vehicles. The roller should weigh from six to ten tons, never more, and may be either horse power or a steam roller.

Maintenance.

The maintenance of the sand-clay road is exceedingly simple and easy, if properly and consistently attended to. The surface should be kept smooth and even, and free from all holes and depressions, and ruts and transverse drains. It is imperative to prevent well defined water courses, even they be small.



Good Stretch of Road in Louisiana, After Completion Along the Proposed Gently Auto Course

from forming in the sand-clay surface; for the sand-clay mixture is peculiarly subject to the destructive action of running water. After each rain, or at least once every month immediately after a rain, the surface of the roadway should be dragged with a split-log drag or some similar device until the surface is smooth and the crown restored. Whenever the surface becomes very rough or badly worn it is best to plough it up and pulverize the material with a harrow, after which the surface is reshaped and consolidated as in the case of a new road. Whenever the sand-clay has worn too thin, new surfacing material should be added before the roadway is ploughed and harrowed; as otherwise the old and new material will not mix or stick together, and the new surfacing will scale off and soon be wasted.

The side ditches should be given a general cleaning and repaired at least once in the early spring and once in the early fall. All trash and other obstructions should be thrown out on the sides opposite from the roadway; and all scoured places and holes in the ditches should be filled up with firmly packed rock and clay. Especial care should be taken to see that

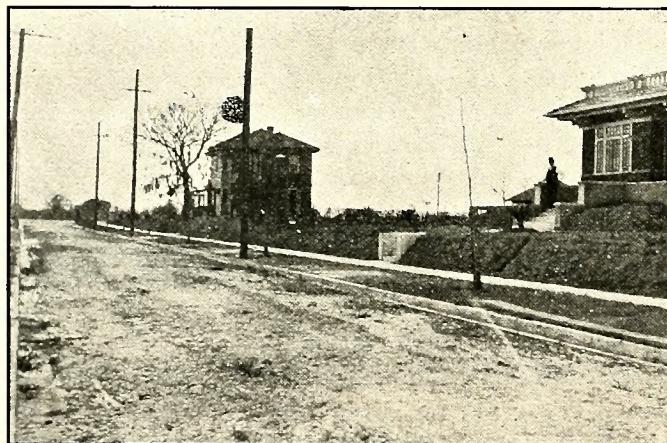
all outlets are open and ample to take all of the water entirely away from the vicinity of the road. The shoulders that form between the roadway and the

side ditches should be removed so that all water falling on the surface of the road can at once flow into the side ditches.

Good Roads and Lumbering

By DR. JOSEPH HYDE PRATT, State Geologist of North Carolina

Transportation plays as important a part in the lumber industry as any other phase of the business, and, in some instances, lack of favorable transportation facilities has caused lumber companies to go out of business. We are apt on first thought to think of transportation facilities as applying only to railways and water-ways, yet it applies just as aptly to public roads: the former are the main lines or large veins and arteries of transportation, while the public roads can be compared to the small capillaries penetrating every portion of the system; for it is the public roads that penetrate into all parts of the state. The railways and water-ways would accomplish but a small part of what is expected of them were it not for the public roads, and it is necessary to have well constructed public roads and to keep them in good condition so that the flow of products to and from the interior to the railways and water-ways will not be obstructed by rocks, mud, sand, or water.



Surfaced With Shells But Not Rolled. Along the Proposed Gentilly Auto Course in Louisiana

While some sections of the country in which lumbering is carried on extensively, are so situated that it is a feasible and economical proposition to build tramways or logging roads into the forest in all directions on account of the flatness of the country, and to transport the logs to the mill at the railway or water-way, yet there are large sections of the country, and especially in the Southern Appalachian Region, where it is not feasible or possible to construct the tramway or logging road and it is necessary to haul the logs or the cut lumber from a few miles to fifteen and more miles to the railway. Thus, in the latter case, the public road becomes a very important factor in the lumbering industry, and upon the condition of these roads very often depends the profit of the lumber company.

The Southern Appalachian Region contains the greatest variety of hardwoods to be found anywhere on the American continent; for it is here that there is an intermingling of the sylva of the North and South,

Here, trees that are common to New England are found in close proximity to those which are common to the more southern states. Here, are to be found trees from five to ten feet in diameter, which often tower to a height of 140 feet. North Carolina, which contains the largest area of hardwood forest of any of the southern Appalachian states, is unequalled in its variety of hardwoods and conifers by that of any other state or territory. There are found in this state 24 kinds of oaks, 8 varieties of hickory, 6 of maple, 6 of magnolia, 3 of beeches, 8 of pine, both species of hemlock and balsam, fir, 3 of elms, 6 arborescent species of plum and cherry, and 3 of pyrus.

Large areas of these commercial forest trees are long distances from the railroads, on mountain slopes, between which and the railway are deep ravines and valleys and other mountain ridges, so that the only connection with the railway is by means of the public road. Many of these roads have been in such condition that it was only possible to haul during certain seasons of the year, and, then, only a minimum load. Many of the lumber companies who have bought up these extensive areas of timber have no interest whatever in the county or the state in which the forests are located, and their one idea and object is to make the most profit out of them at the present time with no thought for the future. This is natural, but, at the same time, it is a decided detriment to the future growth and development of the county and state. I believe that one reason why we find our forests left in such a condition as they are by many lumber companies, is on account of the great expense of getting their product to the railroad.

In many of the counties of the Southern Appalachian region the cost of hauling the timber to market is greater than what the owner receives for the timber on the stump. As an illustration of the amount of money that is being expended for the transportation of lumber over many of our public roads, I will give some figures regarding the sixteen counties in North Carolina that are west of the Blue Ridge. In this region three-fourths of the area is now in forest, and the larger portion of this area is better adapted to the production of forest than any other purpose. During the year 1909 it was estimated by the State Forester of North Carolina that fifteen million cubic feet of timber were hauled to market or to the railroad by wagon over the public roads of these counties. The estimated cost of hauling this timber was \$750,000, and this amount is twice as much as the timber itself is worth on the stump. With this excessive cost of hauling, it can readily be seen that only the most desirable types of timber can be hauled, and that the lower grades and inferior species be left in the woods; also that the tops and small logs which would make cordwood cannot be touched, as there would be no profit in hauling it to the railroad. Thus, these are left around in the forest and become a serious menace on account of detriment to the future growth, and injury to the trees that are left. With these conditions, it was only natural that the lumbermen should skin the forests of

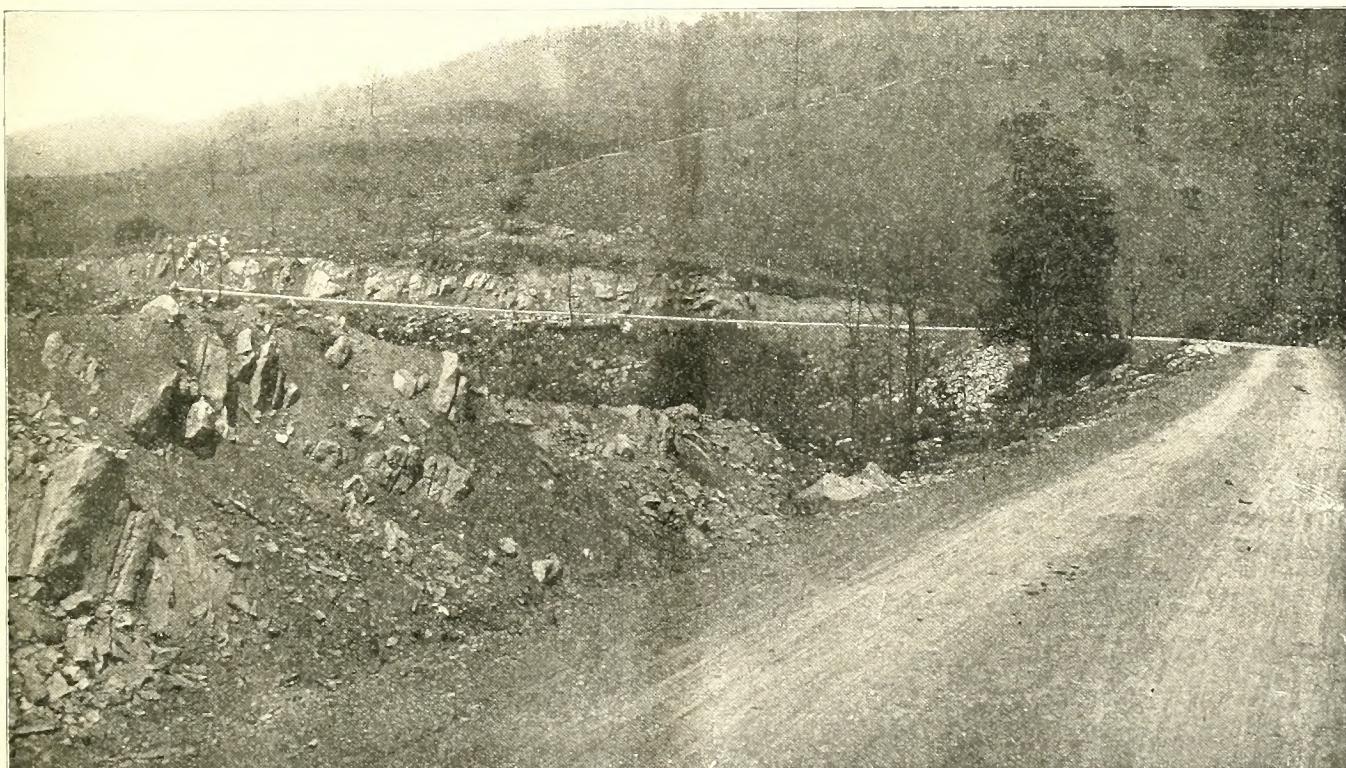
every single desirable tree that will furnish a profit if cut and hauled to market; and this meant that in many instances over certain areas every single good seed tree has been cut, leaving the forest destitute of any chance of reproducing the more valuable trees. Thus, many of the forest areas of the Southern Appalachian Region have been almost entirely depleted of many of their most valuable trees; such as black walnut, cherry, yellow poplar, and white oak.

As I have stated before, with conditions as they have existed, there has been but little incentive for the lumbermen to practice scientific forestry, and yet we all know that the forest cannot be managed to the best advantage unless the inferior species and lower grades of timber can be profitably marketed, and this is only possible where the cost of transportation is low enough to warrant it. There is but little chance of reducing the cost of transportation of logs or lumber over the railways, but there is a splendid opportunity of greatly reducing the cost of transportation of the logs and cut lumber to the railroads over the public roads. Very often the difference between \$1.00 and \$2.00 per ton for hauling, or the difference between a bad and a good road—will determine the question of profit or loss in marketing timber.

The good roads movement has been spreading over North Carolina rapidly and there are now but few sections of the state that are not alive to the value of good roads, and in the Southern Appalachian Region many of the counties are now agitating bond issues for good roads and are applying to the North Carolina Geological and Economic Survey for engineering assistance in the location and construction and maintenance of their roads, realizing that the best results in this kind of work can only be obtained through the supervision of competent engineers. The roads that are being planned throughout these mountain counties will penetrate through many of the forest areas and reduce the cost of hauling logs and cut lumber very materially.

The construction of these good roads is not only of great advantage to the lumber companies but it is also of great advantage to the owners of timber land as it increases the value of standing timber. Two tracts of timber the same distance from the railroad, with the quality of the timber approximately the same, the one that is connected with the railway by a good road will be worth from two to three dollars more per thousand on the stump than the other. Then again, cordwood, which is essentially a low grade forest production is now not marketable over the greater portion of the forest area of the Southern Appalachian Region. The removal of this material in practically all cases, would improve the condition of the forest, yet it cannot be marketed profitably without good roads. In Buncombe county cordwood is being hauled six to ten miles over the improved roads of that county, while at the present price that is received for cordwood in the county, it can only be brought to market a distance of three quarters of a mile to a mile in those sections where the roads are unimproved, for the reason that it not only takes very much longer to haul over the poor road but the size of the load is correspondingly reduced.

The good roads also mean an increased value in the land after the lumber company has finished cutting out the merchantable timber, and the better condition he leaves the land in the greater price he will receive for it. In many sections now, however, where there are no good roads connecting these forest areas with the outside world, the lumber companies consider the land worth little or nothing and are often glad to get rid of it at almost any price. Thus, it is seen that in many ways good roads will vitally affect the lumber companies and the owners of the timber land, and will do more toward bringing about a practical method of conservation of our timber resources than any other one thing that can be done. In connection with this phase of the subject, I wish to quote from the report of the State Forester of North Carolina, regarding the

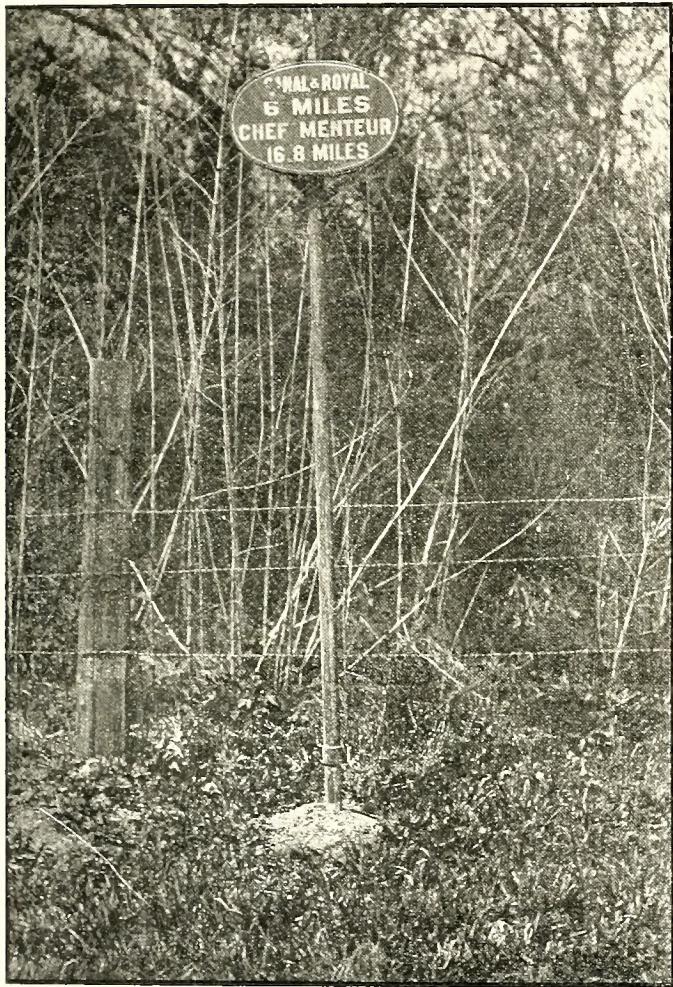


Section of Macadam Road Between Bluefield and Princeton, West Virginia

cost of hauling forest products over the roads of one of North Carolina's mountain counties:

"Last year it cost the people of Mitchell county approximately \$130,000 for just the hauling of their forest products to the railroad. With good roads, there is no doubt that this cost might have been cut in half. This same county has a forest area of upwards of 175,000 acres. If this area were protected from fire, and lumber conservatively cut, the present large output could be indefinitely maintained, so that an annual saving of \$65,000 to the people of this county could be secured as long as the good roads should last."

This is not an exceptional case, and the illustration is just as applicable to many counties of Virginia, North Carolina, Georgia and Tennessee.



Metal Signs Like the Above Should be at the Crossing of All Public Highways as Well as at Other Places Along the Road to Keep the Traveler on the Right Track.

The lumber industry is undoubtedly interested in the future supply of timber, although many of the individual lumber companies pay little or no attention to this. The forest area of North Carolina amounts to more than 10,000,000 acres, a very large portion of which is steep, rough, or poor land, which is not suitable for agricultural purposes, and for many reasons it is very essential that these areas should be kept in forest. The importance of the forests in North Carolina is strikingly shown by the fact that the forests and the industries dependent upon them produce material amounting in value to more than \$35,000,000 a year, and give employment to 30,000 men. The furniture industry in the state is absolutely dependent upon a permanent supply of hardwood; the tanning in-

dustry is dependent upon a constant supply of tanning material; and the paper industry is dependent upon a constant supply of pulp wood. The Forestry Department of the North Carolina Geological and Economic Survey, after careful investigation, believes that it is not only possible to make these industries permanent in the state by giving them a constant supply of the woods that they need, but that it is possible to enable these industries to develop to a still greater extent.

If this is to be accomplished the quickest and to the best advantage of the state, all interests that in any way affect forestry must unite. The one thing that will bring these interests together quicker than anything else is the construction of good roads throughout these timber counties.

The North Carolina Geological and Economic Survey is assisting the counties in every way possible to bring about the construction of systems of good roads in the counties and also to have these roads connect with the roads in adjoining counties. The survey has been successful in getting the counties to co-operate with each other in the construction of these inter-county roads, and there are now contemplated a number of roads in the Southern Appalachian Region that will open up and make more accessible large tracts of timber. Perhaps the most important of these is the Crest of the Blue Ridge Highway, which will start from some point on the Norfolk and Western railway, such as Marion, Virginia, pass across White Top Mountain and then enter North Carolina in Ashe county, and go via Beaver Creek, Ashe county; Boone, Watauga county; Blowing Rock, Caldwell county; Linville and Altapass, Mitchell county, this later point being on the Clinchfield railway; Gillespie Gap; Switzerland; Gooch Gap; Buck Gap; Toe River Gap; Stepps Gap; Balsam Gap; Bull Gap; Asheville; Weaverville; Mars Hill and Hot Springs to Newport, Tennessee. This will open up the great forest areas of the Black and Great Craggy mountains. Just to the east of Pinnacle Mountain a branch road is being planned to Swannanoa, Black Mountain, Hickory Nut Gap to Hendersonville; still another from Stepps Gap to Black Mountain, which is on the Southern railway. In Henderson county a road is being constructed across the county to the top of the mountains on the South Carolina line; and this will be continued to Spartanburg, South Carolina, and also another branch to Greenville, South Carolina. Another road that will open up considerable timber country is a part of the Salisbury-Asheville Highway, which will go from Old Fort, McDowell county, to Swannanoa Gap and Black Mountain. While these are the main roads planned, yet all the counties are taking an interest and are wide awake to their need of connecting all parts of their counties with these roads. In all this road work the Highway Division of the Geological and Economic Survey of the state are advocating that no grade shall be over 4½ degrees, and that the roads shall be surfaced with sand-clay, gravel or macadam. It is also constantly advocating the use of wide tires on these improved highways, which will greatly reduce the cost of their maintenance. The constant hauling of lumber over the public roads has probably done more damage than the hauling of all other products combined, and is due to the fact that all the lumber wagons use narrow tires, and they cut deep holes and ruts in the roads which it is almost impossible to keep in repair as long as such hauling is being done. With improved roads, it will be possible to use broad tire wagons, which will in many cases assist very materially in maintaining the public road.

Co-Operative Continuous Maintenance of Highways

A Plan Proposed by the Preble County, Ohio, Good Roads Association

In this article is set forth, as briefly as possible consistent with clearness of statement, a newly proposed plan for the better maintenance of the public roads and some of the arguments in support of it.

The plan is based upon a clearly defined distinction between Road Maintenance and Road Construction or Repair, a distinction not made under present methods of road management. It also contemplates the use of the road drag as a means of road maintenance and recognizes the so-called King Drag as the ideal implement for the purpose, first, because of its demonstrated efficiency and secondly, because of its low cost of construction and operation. For the best results the drag should be correctly made and used, for in this as in everything, there is a right and wrong. Farmers' Bulletin No. 321 of the Department of Agriculture, Washington, D. C., gives detailed directions for making and using the drag and may be obtained free by any one requesting it.

In order to have a clear comprehension of the plan the following universally recognized facts should be stated and borne in mind in its consideration:

1. By law, all citizens of ages from 21 to 55 are required to perform two days labor on the highways, as a poll tax.

2. Under existing conditions practically all the labor performed on highways is done by the farmers living adjacent thereto; road superintendents and even contractors rely almost entirely on them for hands and teams.

3. By present methods little or nothing is done to the roads except to deposit new material on them, which is then left indefinitely without further attention.

4. By reason of the last mentioned fact many roads provided with abundance of material are nevertheless bad roads for lack of proper attention and maintenance.

5. Little or nothing can be efficiently or economically done toward smoothing or shaping the road surface when it is dry and solid, but this is easily done when the surface is softened by moisture.

There will be universal agreement as to the above statements of fact for they are of common knowledge and do not admit of dispute.

The proposed plan contemplates such a change in methods as will virtually introduce the "patrol" system, or continuous maintenance in vogue in France and other foreign countries, though at far less cost. It is a principle well recognized by all road experts that the best results can not be secured except by constant oversight and the application of the "stitch in time." It is apparent, even to the most casual observer, that far better roads would be had if the holes and ruts could be filled, ridges scraped off and the loose stone removed whenever and just at the time it is needed to be done. What is required is a little work done often, at just the right time. This could be accomplished, of course, by the constant employment of men on the roads, but this would necessitate a heavy increase of expense and a consequent increase of the tax rate, besides being open to the further objection that these men would be employed much of the time when the roads were not

in the best condition for treatment, and consequently would be working at a disadvantage, besides losing much time in going from place to place on extensive sections.

The proposed plan provides that the road authorities shall divide the roads into short sections, according to the number of poll tax payers, and assign to each man the section nearest and most convenient to him, who would assume the responsibility of keeping the same in good condition by working his poll tax on it, not all at once but at intervals as needed, thus introducing the valuable essential features of the patrol system. It is estimated that in no case would these sections comprise more than a half mile of road.

A sufficient number of the road drags already referred to would be provided so that every two or three of these section men could have one, or each could have his own if more desirable. As soon as the frost is



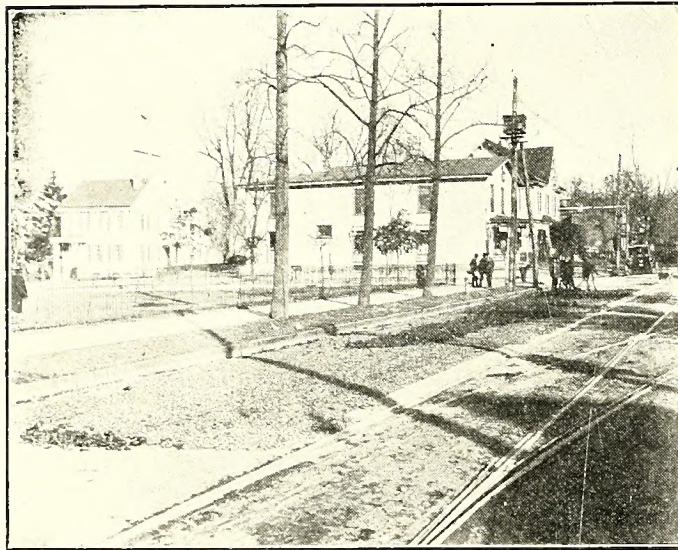
A Modern Bungalow on the Proposed Road of the Gentilly Auto Course, just completed.

out in the spring and while the road is yet somewhat soft and plastic, these men would go on the road each on his own section, dragging it thoroughly, scraping down the ridges, filling the ruts and holes and crowning and smoothing the surface so that it would shed water. Not more than two hours would be required to do this and it would be done at a time when it would least interfere with farm work. Later in the season, whenever there was a tendency to develop ruts or holes, each would again apply the same treatment, just following a rain. Only a rain that would make the fields too wet to work for at least a few hours would soften the road sufficiently to make it suitable for dragging, so that again the farmer would be enabled to do his road work without undue interference with his farm work.

A very important point may here be noted, viz: That by this plan the roads in any district, no matter how large, even in an entire county, could all be dragged and smoothed and put in good condition within a few hours, while they were in exactly the right condition to do it most effectually and at the least cost, while if the work had to be done by a few men and teams, even in a limited district, the road surface would be

come too dry and solid to do efficient work before all of it could be reached. It is evident, too, that such a plan could not be worked by the superintendent ordering his men out to do the work, for the reason that he could never know in advance when the right time would be, as that depends on the weather, and when the conditions suddenly became just right, before he could "warn-out" his hands and get them to work, in many instances the favorable conditions would have passed and it would be too late.

Actual experiment has demonstrated that not more than four and in many cases only two draggings, if properly done at the right time, are necessary to maintain an average road in a smooth condition, free from ridges, ruts and holes. Assuming an average of three times and allowing two hours for each, it is seen that this would consume six hours of the ten due from each poll tax payer with a team, on his section. This would leave four hours, or eight hours for a single hand, which time would be utilized in raking off loose stone, or in other minor attentions required to keep the road in the best condition.



This is an illustration of the method of construction of Amiesite Roads, the first course of Amiesite laid on the base being shown in the foreground, then the filler course back of this and in the distance the completed road. This particular road was laid on an old macadam base at Moorestown, N. J. in 1909.

It is thus seen that under all ordinary conditions the two days labor alone would keep the roads in good condition, preventing the formation of mud and the resulting dust and the consequent loss of material, and thereby greatly prolong the life of the roads, as well as render them far more comfortable, safe and convenient for travel.

Under the present system practically all the work done on the roads, including the two days labor, is devoted to putting on new material, but no provision is made for the care and conservation of it after it is applied at a heavy expense. Under the plan here proposed the two days labor would be reserved exclusively for maintenance, to be applied "a little at a time and often" as conditions might require. Not the least of the merits of the plan is in the fact that it enables the farmer to work out his poll tax in a way and at times most convenient to himself and on the road adjacent and convenient to his own farm. It would also directly and strongly tend to arouse a personal interest and pride in the roads on the part of every citizen, a

friendly rivalry in making them the best possible, and lead to a more careful and intelligent study of the road problem and the consequent improvement of methods.

Let it be distinctly understood that nothing whatever is claimed for this plan so far as construction or extensive repairs are concerned. It is designed and recommended alone for the maintenance in the best condition possible at all times of whatever road surface there may be, using for this purpose the two days labor and, if found necessary occasionally, a small part of the road fund, but leaving, as now, the great bulk of that fund for repairs and the renewal of material where required. As each section would always be under the eye of a man specially charged with its care and specially interested in it, he would be most familiar with its needs and best qualified to report to the superintendent where repairs or material were required. In all cases where new material is applied it should be dragged and smoothed at frequent intervals while the process of packing by the traffic is going on, and this plan provides a means whereby that may be done.

This plan calls for no donations or any sacrifices on the part of any one. On the contrary it provides an easier as well as a better way of working out the poll tax. It does, however, call for a live interest in the roads, for some broad and intelligent thinking on the problem they present, for an arousal of civic pride and patriotism and for a hearty co-operation on the part of the citizens of the community. But is this too much to expect? Co-operation is an absolute essential to the accomplishment of any large work. This has been learned and is heeded by those in every other walk of life. We believe it is possible that farmers may be brought to practice it also.

This plan is submitted for your earnest and careful consideration. Try to discover its merits if it has them, or its defects if there are any.

And why not try it out in actual practice? It would be easy. If not in an entire township, at least in a small district, or even a few adjoining farmers, or one alone could arrange with the road authorities to work out his poll tax in this manner. This would demonstrate just what the actual results would be and, it is confidently believed, would pave the way for a revolutionary advance in the maintenance of the average country road.

Work has commenced on the public road leading from this city to Wellborn, via Houston. The work being done now will be paid for by citizens of Live Oak, who are very much interested in securing for this county the Jacksonville-Atlanta highway. Work on this road will be pushed as fast as possible, and it is hoped the board of county commissioners will arrange for taking charge of the work. The citizens of Wellborn have expressed a willingness to join, with a substantial contribution in building a good road from Live Oak to the Columbia county line.—Live Oak (Fla.) Democrat.

The great trans-state highway from Bristol to Memphis proposed by Gov. Hooper is going to be built. Several counties have already petitioned the legislature to grant authority to issue bonds for the purpose of aiding in the construction of the road. Commercial bodies, automobile associations, county courts, city councils and individuals have pledged aid to the enterprise. It is going to be built. That much is already assured. Those who stand in the way of its construction are going to get short shrift from the people.—Columbia (Tenn.) Herald.

Keeping Roads in Repair

By MR. GEO. E. MILLER

The paramount questions of the day are not those of tariff schedules and military equipment, but of good roads and good schools. The great body of American citizens will be little affected in purse or comfort whatever is done touching the former. The latter concern the fortunes and well being of millions who, at the bottom, conserve and guarantee the best interests of the country. In the south we stand at the very threshold of the marvelous development of these two branches of civic activity. In no state, in no section of any state, are the omens more auspicious than in Tennessee and East Tennessee. Much has already been done by way of agitation and construction; but this amount pales into insignificance in contemplation of the energy and resources to be put in operation.

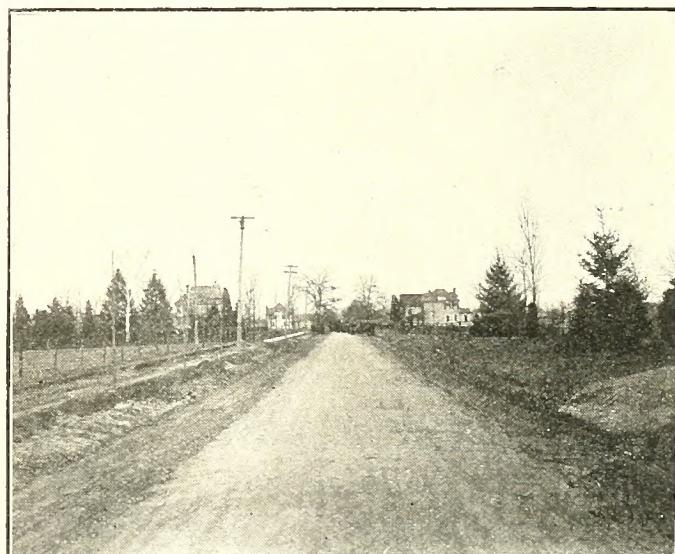
For climatic, topographical and mineralogical reasons, the valleys and mountains of East Tennessee are destined to become the abodes and resorts of a teeming population composed of the best elements of native-born and foreign-bred Americans. For pleasure, for health, for livelihood, they will come from the four quarters of the globe. It will be no sporadic movement, but a steady peaceful invasion, gathering increased momentum with the years. I believe verily what that master of finance and construction, William J. Oliver, once said substantially to me: "If the people of this section were alive to present opportunity and future possibility, they would be so eager for trade and progress that they would be swapping jack-knives and multiplying indefinitely their activities." The characteristic remark was the expression of a man of rugged individuality and rare sagacity whose foresight took in broad survey a region abounding in resources and capabilities.

While Mr. Oliver is primarily a railroad builder, he is also a builder and advocate of good roads. He, as every other citizen of acumen, knows that no single interest is without its tributary interests. The competition begotten between the two species of roads inures to the advantage of both. To the square mile, no country of Europe is more densely populated than Belgium. Railroads and public roads penetrate every portion. Each is maintained in the highest degree of efficiency and each is used without stint by the population. The public roads enter into successful competition with the railroads to the extent that the owners of teams far from market get their products into market over the public roads.

In marking achievement and pushing on the wheels of progress, it sometimes behooves us not only to take stock but to note waste and leakage. What boots it to expend money and labor on roads that are for years to be subjected to hard usage and to be treated with neglect? A road tax, productive of a splendid income, is paid, and that always cheerfully where taxpayers can see a wise and safe expenditure. But when an excellent highway has been constructed at large outlay and then is permitted for months and years at a time not to receive one moment of attention at the hands of road commissioners nor one dollar for its preservation, there is a wrong perpetrated somewhere and by some one deserving a rigid scrutiny. The policy savors of rank incompetency or criminal negligence. Whichever of the two be the compelling cause, the responsible non-descripts ought to be politically decapitated so quick as to make their

heads swim. It is precisely for such incompetent and negligent officials that we need the initiative and referendum put into legal effect and speedy practice.

I know a pike built at great cost some eight years ago by a conceded expert in road making. So carefully and skillfully and at such cost a mile had it been built that it was derisively termed a boulevard with the name of the builder prefixed. Its completion offered a practical and beautiful specimen of the road-making art. Like a great funnel it poured its daily traffic and travel into the prosperous city. It was the crowning glory of its constructor and the peculiar pride of its users. Whether palatial homes or humble cottages dotted its course, their inmates looked out on a thoroughfare that was a constant delight. The very beasts of burden that pulled their dranghts along its way seemed to mock at their loads, so easily were they drawn.



This is a photograph of the first road built with Amiesite in New Jersey and was completed in October 1908. This road is located at Magnolia, N. J. and the more wear it gets apparently the better it is. The photograph was taken a year after the road was laid

Today, how changed is its surface and how unsightly its borders! Driving along, one almost stops to wonder if he is not passing over the furrows of an abandoned field, or splashing over mud-holes of uncertain depth, or having his wheels sink distressingly into the regions of China. Long since there were ditches serving for drainage; but, lo! these many years, they have been filled from the freezes and washings and have become the chosen abodes of rank weeds and nipping briars. Therein the rabbit may hide himself in safety, or defy his pursuers. The winter's rains no longer fall to find instant reception in prepared ditches, but gather themselves in a tumultuous torrent and rush down the center of the road bed. What a charming playground for ducks! No wonder they quack and sport in wild glee with every summer shower or winter rain. If gratitude ever wells up in their beings, it must be towards the pike commissioners who make life for them one grand, sweet song whenever the rain falls.

By way of comparison, however odious, let one read

an American consul's description of French roads: "The roads of France are remarkable for their durability, evenness and cleanliness. They are watered and swept every day and kept in scrupulous order. No rugged eminences or depressions jar the nerves of the traveler riding over them. Neither dirt, decay nor rubbish is about, to suggest neglect or ill care. They are immense garden paths, amid a marvelous landscape of verdure and cultivation."

This is from another consul in France: "In the high mountainous regions of the Isere I have seen, after a violent summer rain of thirty-six hours' duration, fifty yards of national road, including a small bridge, washed away by a fearful torrent rushing down from a cloud-capped field of ice with an almost vertical fall of 2,000 feet. In three hours, and in the midst of a severe storm, I have seen that same road repaired temporarily and made passable by the road men in this remote and little frequented region. It is this never failing watchfulness and promptness in repairing roads, which gives France a system of roads which at once is a source of national strength and of national pride."

There is not a business enterprise which, if managed with the same loose, reckless methods that mark the care of some commissioners, would not go into bankruptcy. It is nothing short of remarkable how a long-suffering and tax-paying people put up with the incompetency and negligence of their public servants. The little brood of politicians who pretend to manage such grave interests should be utterly discarded, and men of engineering skill, sound wisdom and approved merit should be speedily substituted.

Cost of Bad Roads.

Those are pretty big sums of money which Mr. L. W. Page, director of the United States public roads offices and President of the American Association for Highway Improvement, says are lost annually in the United States on account of bad roads. Forty million dollars, he estimates, is wasted yearly through inadequate

methods of construction, maintenance and administration of the public highways, while the enormous sum of \$250,000,000 is an indirect loss occasioned by the difficulties of transportation over them.

Any one at all familiar with the public roads throughout the country will consider Mr. Page's figures conservative. It is to say that every man, woman and child in the United States pays more than \$3 each every year as a tribute to poor roads. Should the waste be diverted to the upbuilding of the roads, it is probable that they would be in 100 per cent. better condition within five years than they are now.

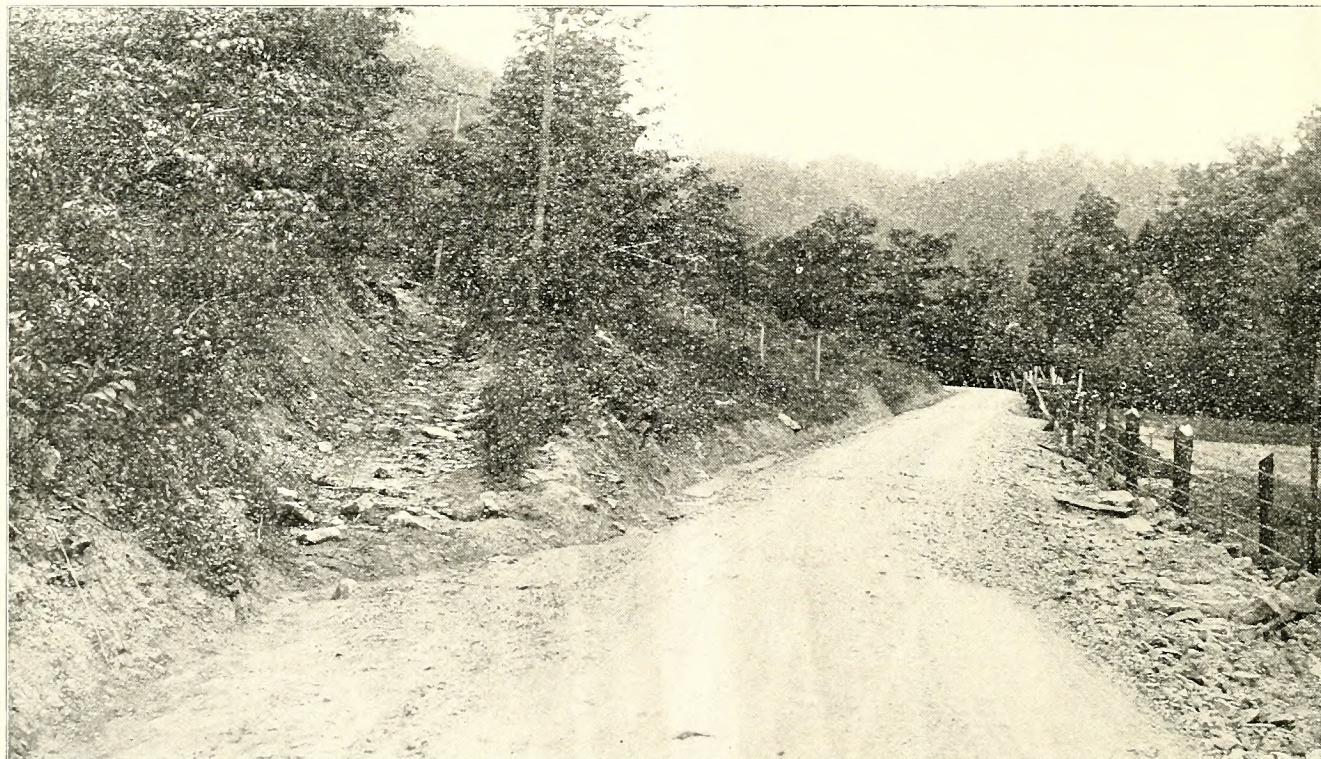
The states of the country, with a few honorable exceptions, have been in nothing more negligent than in the building of roads. Many of the public highways are in no better condition now than they were 100 years ago. Every farmer knows the cost of bad roads, but the cost does not fall exclusively upon him.

In France, the director points out, where the roads are good, one and one-third times as much produce is carried over them as over the railways, whereas in this country, it is possible to carry less than one-fourth as much as the railways carry.

It is not a pleasant statement to make, but nevertheless true, that the average Virginia road is as bad as any in the country, and the average of them Tidewater Virginia are no better than they are in any other section of the state.—Norfolk (Va.) Landmark.

The national highway between Atlanta and New York was announced simultaneously by the New York Herald and Atlanta Journal. It is already an assured fact between New York and Atlanta, and extends from New York to Bangor, Me. If we can get a real good road between Jacksonville and Tampa via Gainesville and Ocala, we will be in position to take long automobile tours.—Ocala (Fla.) Banner.

Dallas county, Ala., will build $6\frac{3}{4}$ miles of road at a cost of \$15,000.



Section of Macadam Road Constructed by Convict Labor, Between Welch and Gary, McDowell County, West Virginia

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THE GENERAL ASSEMBLY OF 1911.

There were three measures before the General Assembly of 1911 of North Carolina relating to State aid to counties for good roads which had been endorsed by the State Good Roads Roads Association, and thirty-odd county Good Roads Associations; state organizations, including the Press Association, Travelers Protective Association, Bankers Association, Medical Association, and others, endorsed the state giving engineering assistance to the counties in the construction of their roads and the use of state convicts on the public roads. A number of the members of the General Assembly were elected wholly or partly on a good roads platform, and it was fully expected that the General Assembly of 1911 would pass some measures relating to state aid. The form of state aid that was most desired by the counties of North Carolina was engineering assistance, and if this bill had been passed it would have meant:

1. Great saving in the expenditure of money derived from a bond issue or special tax for good roads construction, for at the present time a considerable proportion of the counties' road funds is paid for experience.
2. Roads properly located, irrespective of personal interest or politics.
3. Roads constructed out of the best and most economical material available in the county, and it requires a road engineer of wide experience to determine this.
4. That the counties would have been able to obtain up-to-date information relating to all phases of road construction, as a department would have been organized which would have kept in touch with all modern methods of road and bridge building, etc., and would have conducted experiments to ascertain the best material to use in surfacing roads.

The bill relating to engineering assistance came up in the Senate after the other state road bills had been defeated, and passed the senate with little or no opposition. It was sent over to the House, where its friends expected it would also be passed with very little trouble, but they were surprised one morning, on inquiring, to find that the bill had been tabled about midnight the night before, without any of the good roads advocates knowing it had come up. An eloquent plea was made and a resolution introduced to have the bill taken off the table, so that the members could have the privilege of voting on it, but a motion was immediately made by the opposition to table the resolution, and this having passed, it effectually killed the engineering assistance bill. If this bill could have come up on the floor of the House, it would have had a very good chance of passing, as it was the opinion of a great many members of the House that a majority favored the passage of the bill, but certain members were insistent that it should not be allowed to come to a vote. The failure of this bill to pass will mean that North Carolina will continue to lose, through its counties, a great deal of money, which will be wasted in public road construction and maintenance, which undoubtedly could be saved if the state was in a position to give the engineering assistance that the counties desire. It is to be regretted that this legislation was not enacted, as it was something the state needed and the people desired, and would have been as important and progressive legislation as was considered during the session.

MAINTENANCE OF ROADS.

One of the most important phases of work on the public roads is their maintenance, and yet this is often given little or no consideration by those who have charge of the public roads of our counties. This is especially true as it relates to dirt roads. On this class of roads the repair work is seldom done at the time of year when it will do the most good for the road, and this is true not only in those counties which have the labor tax, but also in many townships and counties where there is a special tax on the one hundred dollars worth of property for road work. In the former case the overseers usually call out the men who are subject to road work at the time of year when these men haven't very much to do, and very often this is the time of year when the work done, even if it is done in the very best manner, is of least benefit to the road. This is usually the only time of the year that the dirt road will receive any attention, although they should be repaired whenever they need it. Even this yearly repair work is often a waste of time and money, on account of the manner in which it is done. Running a very small plough along the ditches, shoveling everything that may be in the ditches into the middle of the road, regardless of whether it is dirt, mulch, grass, twigs, leaves or stones, filling up holes in the road with boughs of bushes and trees weighted down with stones and covered over with dirt, represents with a

great many men who have charge of the road work, the way to repair the road. Instead of this being a benefit to the road, it is usually a decided detriment.

If those who have charge of the repair of our dirt roads could be made to realize that a dirt road should always be kept a dirt road, that all vegetable matter and rock should be kept off of it, that all ruts and holes should be filled up with dirt of as nearly the same character as the balance of the road, and that it should be thoroughly drained they would soon find that they could keep their dirt roads in good condition, at a low cost and if the split log drag was judiciously used it would keep a dirt road in good condition throughout nearly the entire year.

Roads that have been surfaced with macadam, sand-clay, or gravel also need constant attention and the maintenance of these roads should not be put off, as it is in many counties, for two years or more, but they should be examined, and repaired whenever they need it. No matter how carefully a road has been constructed, weak places are apt to develop and these should immediately be repaired. Systematic maintenance of our public roads is an economy that should be practiced by all our counties.

One of the main reasons for this lack of systematic and satisfactory repair to our public roads is due to the fact that often there is no one employed by the county to have charge of the road work who has sufficient knowledge regarding the construction and maintenance of roads. There is sufficient money and labor expended each year by a great many counties throughout our southern states, to thoroughly repair their roads, if it was judiciously expended under the supervision of competent road engineers, but at the present time a large part is wasted.

There should be a more general construction of bridges over the creeks and streams crossed by the public roads, and also a more general use of culverts for carrying the water across the road, instead of permitting it to flow over the road, cutting it out and, in many instances, flowing down the middle of the road for some distance, before it has an opportunity of leaving the road on the opposite side.

Another condition that would assist very materially in the maintenance of our public roads, would be the use of wide tires on wagons. Even on a dry road heavily loaded wagons, with narrow tires, will cut into the surface of the road, and as there is always a tendency on our country roads for one team to follow directly behind another, the ruts becomes deeper and deeper. In wet weather they make the road almost impassable. On the other hand, if broad tires are used, they would have a packing influence on the surface of the road, and then if our drivers would use a little care, so as not to drive exactly where the last wagon did, the wear would be distributed and the surface of the road would be kept smooth, and it would thus aid very greatly in maintaining this smooth surface. Even on macadam roads the narrow tires cut

shallow ruts, which could be avoided by the use of wide tires.

The south is on the eve of a great awakening along all lines of industrial endeavor and especially is this true of the building of good roads. During the last six years the south has built 20,000 miles of good roads. In this work Georgia, because of progressive legislation that a few years ago placed the state convicts on the public roads, leads by a good margin. North Carolina stands second, Texas third and Alabama fourth. We confidently expect the next six years to show more than 200,000 miles of good roads built, because the people of the south are just learning how to build roads. Profiting by the experiences of the pioneer road-builders, the south will build better roads and cheaper roads. It has learned that there other kinds of road besides macadam and while macadam will remain the highest type of road construction, the road best suited to the individual needs of the communities through which they are to pass will be built. Sand clay, gravel, top soil and good dirt roads, will mark the south of the future.

Good Roads in Tennessee.

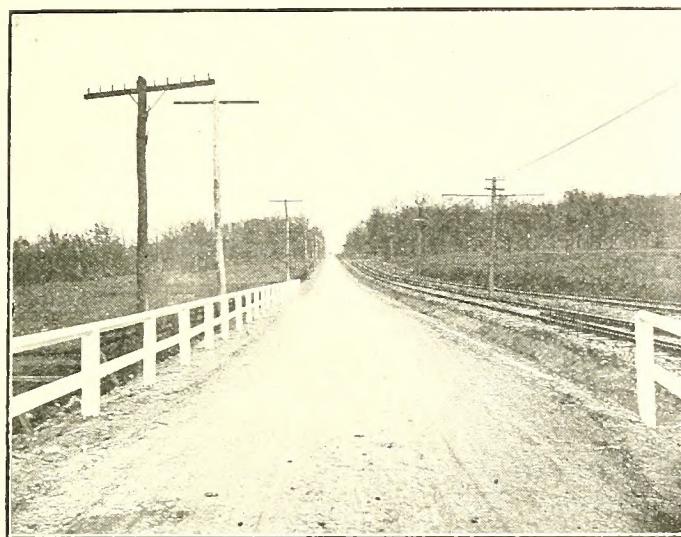
The visits of the highway committee of the state legislature to various sections of the state undoubtedly has convinced the committee that sentiment throughout the state is heartily favorable to good roads legislation. Never before have the people of Tennessee been so united in their desire for better highways. The good roads sentiment is in every county of the state, and no more popular legislation could be enacted by the present general assembly than a state-wide good roads law. Various good roads organizations over the state and numerous individuals and others interested in the good roads subject, have offered suggestions to the committee as to advisable legislation. The committee is now in session in Nashville, considering the suggestions, and the conditions as it has found them, preparatory to formulating its report to the general assembly. It is expected that this committee will offer bills to the legislature, providing for a good roads project that will be state-wide in its scope. Certainly, the Bristol-Memphis highway plan, with tributary roads reaching all the important points in the state, will be encouraged. Other vital features including state-aid to good roads, should and doubtless will be recommended for favorable action of the assembly. The legislature will make no mistake in providing for a thorough system of good roads in Tennessee.—Knoxville Tribune.

The Herald favors the Bristol-to-Memphis road, but somehow the people in this county won't enthuse much. Gentlemen, the Herald thinks the scheme all right, and believes it should have the hearty endorsement of the people everywhere. We like it because it does not require taxation. We would oppose a move to construct such a road at the expense of the whole people of the state. Diekson citizens should get busy and offer the proper inducements to have the road pass through this county. We can get it; we want it. But unless we try, we are not apt to do much at this or any other road building.—Diekson County (Tenn.) Herald.

Amiesite.

Amiesite, a material for the wearing surface of streets and roads, is manufactured by Amies Road Company, which has its office at 580 Bourse Building, Philadelphia, Pa.

It consists of graded crushed stone covered with asphalt. Contrary to the usual practice, under the Amies patents the stone is not heated. Instead it is taken directly from the crusher, dumped into the mixers, a ton at a time, and after the mixing process, consuming about five minutes, it is dropped through a door in the bottom of the mixer, into a gondola car standing beneath, and transported to destination ready to be spread without further treatment.



This is a much travelled road between Altoona and Hollidaysburg, Penn., and was laid 1909 and is an exceptionally good road today.

Owing to the interest taken in good roads by the railroads, the rates on crushed stone are applied to Amiesite.

It is the policy of the Amies Road Company to avoid the use of portable mixing plants on account of the increased cost, and instead establish permanent plants at the quarries.

The eight mixing plants owned by the Company are so distributed, that it can make delivery on the tracks of any railroad in the state of New Jersey, the state of Delaware, the eastern half of Pennsylvania, the south eastern counties and Long Island in the state of New York, at rates running from 30. to \$1.00 per ton, with an average rate of 60c.

The Company was incorporated in January 1909 and at the close of 1910 had sold Amiesite sufficient to cover a road four inches deep and sixteen feet wide from Philadelphia to New York.

There is no road-making material so simple to handle. For instance the Company sold five hundred (500) tons to Hon. W. C. Sprout, (author of Good Roads Bill appropriating \$50,000,000 to improve the roads of Pennsylvania, now before the legislature) for use on his private grounds in Delaware county, Pa. Every foot of driveway was covered with Amiesite under the supervision of his gardener, by a lot of farm hands, no one of the men employed on the work, except the roller-men, having seen the material before. Numerous similar jobs have been done without the supervision of experienced men.

It can be delivered for small jobs in car loads of

thirty (30) tons, on account of which a large tonnage has been used for private driveways, etc.

The Amiesite specifications provide that it shall be so laid as to make it as nearly voidless as possible, this insuring the wearing quality. It is absolutely water-tight and after a rain immediately becomes dry and re-assumes its normal color. Because of the crown in country roads it sheds water very quickly.

It is dustless, resilient and does not bleed in hot weather, in fact does not change whatever the season. Apparently the greater the travel the better it looks.

In appearance it is as good as any Bitulithic pavement, has double the depth of wearing surface, and costs about half as much.

The bid prices for work in New Jersey have ranged from \$1.15 to \$1.35 per square yard, including the contractors profit, depending upon freight charges and hauls. This covers all costs (exclusive of excavation) of a completed road built of a 6 inch macadam base, a filler of sand or screenings, and the top course of 4 inch loose Amiesite.

After an experience of two years the Amies Road Company believes that it has perfected Amiesite, and it seems the general opinion that it is one of the best materials for a wearing surface on the market at the price.

The editor of Southern Good Roads has ridden over several sections of road built of Amiesite and has inspected the material itself and the finished road carefully and does not hesitate to say that there is a great future ahead of this wonderful road-building material. It seems to be all that the manufacturers claim for it.

A Story of Progress.

Twenty years ago Colquitt county had only 4,794 people in all its borders, and its county seat, Moultrie was an unincorporated village, there being only 645 people in the whole militia district in which Moultrie is situated.

But twenty years has worked a metamorphosis, not only in Colquitt county, but in Moultrie, also. Moultrie now has above 3,000 inhabitants and the county has forged slightly ahead of Early in population.

Those people believe in progress and they believe in advertising and good roads as the surest way to make lasting progress. Last Monday a good roads meeting was held at Moultrie in which people from all over the county participated. It is said to have been the most enthusiastic meeting ever held in the county, and proved conclusively that the subject of good roads would receive the sympathy and encouragement from everyone present.

The meeting was addressed by Hon. W. C. Vereen, president of the consolidated trade bodies of the state, and of the Moultrie Chamber of Commerce.

The question of a bond issue of \$200,000 for road building was suggested and discussed, and met with hearty approval, and if the county commissioners will submit the question to a vote at an early date, it is believed bonds will unquestionably carry almost unanimously.

Why can't Early county organize a good roads club? —Moultrie (Ga.) Observer.

It has been said that a good road from Hamilton to Bradley would advertise James as a "good roads" county. While this is a point worthy of consideration, it would also be the means, we believe, of converting many to the cause of good roads who now prefer pretending to haul through mud to the hub rather than pay a few cents tax for passable highways.—James County (Tenn.) Times.

The Building of the Chef Menteur-New Orleans Auto Road.

(By Mr. John Farmer.)
of New Orleans.

In February 1910 active work on the Chef Menteur auto road was begun and early in March of this year the task of construction was completed.

Prominent people were not only interested but took active part in the project—such men as his Excellency the Governor, Chief Engineer of the State Board of Engineers, the Mayor and City Engineer of New Orleans as well as successful professional and business men, lent their time and attention.

The State of Louisiana furnished the men, portable prisons (for convict labor was used on the "job") tents and guards, while the City of New Orleans donated the use of wagons, scrapers and mules.

The new section of roadway is $7\frac{1}{2}$ miles in length and 45 feet in width.

The total cost of the section just described, was near \$11,000.00—of this amount the City of New Orleans subscribed \$3,000.00. One of the most important and noticeable features in connection with raising the money for the work was that a Land Company thru' whose property the road runs, readily subscribed \$3,450.00.

At the terminus of the road and on Lake Ponchartrain where fishing abounds, a road house will be erected at a cost of from \$8,000.00 to \$10,000.00.

With the completion of the above stretch of $7\frac{1}{2}$ miles we have one of the most beautiful roads of 23 miles with iris fields, stately oaks with Spanish moss and the tropical growth kindred to our section of country.

The new work shows the latest ideas in road building—sufficient crown with ample drainage being given.

The Louisiana Motor League will soon take up the proposition of surfacing with gravel the new work, and, in all probability, a large sum will be set aside for oiling.

Metal signs mark the miles giving distance both to Chef Menteur and New Orleans.

The project of constructing the roadway was backed and financed by the Louisiana Motor League and their books show that all obligations were promptly met and so it is the entire affair is a decided success.

Already property adjoining this road has increased largely in value and very desirable residences are going up rapidly.

The Tarvia Modern Pavement.

The experience of the last few years has demonstrated to road engineers everywhere that a turning point has been reached in the problem of maintaining macadam roads against the disintegrating forces of modern traffic.

When the destructive action of the automobile tires was first observed, surface applications of bituminous binder were believed to be all that was necessary. Experience has shown, however, while surface treatments, cost considered, give good results, it is more satisfactory and economical to construct the road throughout with a bituminous binder.

It is apparent now to the most casual observer that the road problem must become not one of the protection of the surface alone, but one which concerns the building of the road from the foundation to the top. Engineers, more earnestly than ever before, are seek-



A Minneapolis Boulevard Made Dustless with Tarvia.

ing to bond together their road materials in a way to get lower maintenance costs.

In Tarvia, a prepared coal tar of great tenacity and viscosity, engineers have found a bituminous binder which has given remarkable results.

This material has been in use in various places on this continent for about six years, and has become standard. The only questions now discussed are the details involved in the reduction of the cost of Tarvia treatments.

Cumulative experience has taught engineers the economy of putting Tarvia in the body of the road itself as a binder. The problem was to find a method of road building with Tarvia, which with little or no additional cost over that of present macadam road construction, would provide a road strong enough to hold up under modern traffic conditions and proof against the destructive action of automobile tires.

In 1906 in Somerville, Massachusetts, the experiment was tried of bonding the top layer of $1\frac{1}{4}$ stone in a macadam road with Tarvia. The Tarvia was sprayed onto the road hot from a tank wagon, in a single coat of $1\frac{1}{2}$ gallons to a square yard. The Tarvia was covered with pea stone and the road rolled until solid. This first and now classic experiment was a forerunner of what is now known in the United States as the Penetration Method of Bituminous Macadam Road Construction.

The desirability of using two coats of Tarvia instead of one was soon demonstrated and the method framed into a specification called "Tarvia Filled Macadam," which has become known wherever good roads are built.

A material for this purpose must necessarily meet very trying conditions. It must combine in itself a material which will flow freely at a suitable temperature; one that will distribute easily through the prepared surface of stone; one that will adhere strongly to cold stone; one that will set up and bind the road into a solid mass. It must also have the property of recementing, if for any reasons the pieces of stone become separated during the consolidation of the road. Preparations of tar, alone, fulfill all these exacting requirements, and Tarvia has been recognized everywhere by engineers as the standard material of its class.

The form of construction and the method of applying the materials must necessarily be varied to suit local conditions. In striving to meet the exacting requirements of the broad radiating thoroughfares extending out from the metropolitan centers a new form of construction has been developed during the past two years to which the name of "The Tarvia Modern Pavement" has been given.

In this construction Tarvia enters not only into the top surface of the road, but is carried down beneath the top course. Coupled with the use of Tarvia throughout the road is the use of large stone in the second course. Experiments with this form of construction through the past two years have shown its superiority over other forms where a considerable amount of traffic of all descriptions is to be carried on the road.

Splendid examples of the Tarvia Modern Pavement construction can be seen in Massachusetts on Massachusetts avenue in Cambridge, on Beacon street, Brookline, and in Worcester. In Canada roads have been built which are giving excellent service in Westmount; on the Victoria Pier, Montreal; in Berlin, Ontario; Guelph, Ontario; and Stratford, Ontario.

The foundation of the Tarvia Modern Pavement is prepared as for ordinary macadam, but care should be taken to see that this foundation is properly drained

and properly consolidated, for the best of surface can be destroyed by softness and movement below. Upon the foundation the base course is laid using run of crusher stone 3 inches to 1 inch in size. Usually a thickness of four inches, measured after rolling, will be sufficient. This course is filled, rolled as for ordinary macadam and then has spread upon it $\frac{1}{2}$ inch of clean sharp sand or good gravel. Over this without further rolling is sprayed Tarvia-A to the amount of one gallon to a square yard. Another layer of run of crusher stone (3 inches to 1 inch) is spread over the Tarvia-A to such a depth that when rolled this course will be two and one half inches thick. It is then rolled thoroughly with a steam roller until the Tarvia and sand are drawn up between the stone and until this layer of stone is bedded firmly into the stone below. The layer of Tarvia and sand holds this course firmly in place and cements the top course of the road thoroughly to the bottom course. A spraying of Tarvia-X, a denser grade of Tarvia, is then given to the road, using one and one-quarter gallons to a square yard, and a thin layer of $\frac{3}{4}$ inch stone is spread over the surface. Enough stone must be used to fill in all the chinks of the surface, making it smooth, but not enough should be used to leave any loose material on the top. The road is rolled again until perfectly smooth and a final coat of "Tarvia A" amounting to one-half gallons to the square yard is sprayed on and the road finished by adding pea stone or screenings and given a final rolling.

The Tarvia Modern Pavement is described at some length in order that engineers may recognize its novel features and appreciate its merits. The thorough incorporation of the Tarvia throughout the road insures the binding of every part and the elimination of the internal friction which is so destructive to macadam roads. To the reduction of the internal friction the success of the "Tarvia Filled Macadam" is largely due and in the Tarvia Modern Pavement this internal movement is reduced to practically nothing.

The use of large stone throughout the road and in the surface layer insures a structure strength not obtainable with smaller sizes of stone. This strength-giving principle has long been recognized abroad, but with a water bound macadam it was not possible to use this form of construction satisfactorily. The anchoring-in of the stone in the wearing course by the sand Tarvia matrix, now makes the use of the larger stone feasible.

The use of large stone with Tarvia also obviates a difficulty sometimes experienced in bituminous construction. Since the large stone reaches practically through the whole depth of the course, rolling of the pavement is prevented and the surface remains smooth and without hollows under all kinds of traffic.

The use of the Tarvia Modern Pavement Specification gives to engineers all the advantages of using a larger size stone without any of its disadvantages. The increased strength and wearing qualities of the large stone are presented to the best advantage since the stones are held firmly in place with no chance of movement and with the wear taken alone on the upper surface. To say that Tarvia Modern Pavement construction will outwear other forms of macadam is but to state a fact which is apparent on even a cursory examination of the subject.

The Tarvia Modern Pavement like other forms of Tarvia construction is inexpensive compared with the other forms of bituminous construction. An engineer, by properly designing the road can often save enough in stone, in watering, in screenings, and in rolling, to offset much of the cost of the Tarvia.

Good Roads Notes Gathered Here and There

Florida.

All Florida is interested in the movement to make Jacksonville the southern terminus of the National Highway. This great highway was laid off between New York and Atlanta last year by the New York Herald and the Atlanta Journal and the extension to the Florida metropolis will make the great road all the more important. Scout cars of the Journal and Herald started Monday, March 20, to map out the new extension. Their itinerary included an aggregate mileage of 1677, but it is their labor to map out a course that will be well under 400 miles in length. It is believed that the great highway will eventually be extended further south, touching all of the great beach hotels along the east coast of the state.

The plan of working convicts on the roads instead of leasing them out to turpentine men is now being tried in Florida and it will not be long until every county in the state will have its own force of convicts on the roads. Hillsborough county has already got its gang at work.

* * *

Georgia.

Governor Joseph Brown, of Georgia, is a level-headed chief executive. He has given Georgia a safe and sane business man's administration and the good that he has accomplished is not as apparent now as it will be in the future. Under his administration much work has been done for the cause of good roads in Georgia. The democratic state convention in 1908 demanded that the convicts of the state be put to work on the public roads of the state and this has been done in all parts of Georgia. This stands as a monument to the political wisdom of Governor Brown or some of his advisers, and will finally result in Georgia leading the south in the matter of good roads, if her sister states do not follow in her footsteps. That Governor Brown takes an intelligent interest in the roads of the state is shown by an interview which he gave out recently, commending the work that had been done by the convicts under the direction of the individual counties, but recommending that the counties put more work on main trunk lines leading from one county seat to another so as to give the state continuous through highways. By the adoption of this plan, instead of the plan of devoting so much time and attention to local roads, the governor says that the following results would be obtained:

"We would have thousands of miles of highways over which two made teams could easily carry three tons each of produce; and in automobiles, buggies or wagons communication between localities throughout the state would be multiplied in the elements of rapidity, ease and cheapness. This is no 'pipe dream,' but it is an achievement quite within the reach of the people of Georgia."

In addition to this he points out that there would be a back-to-the-farm movement that would make for the health and happiness of the people. This plan, he added, "would provide a splendid road from Savannah to Augusta, from Augusta to Athens, from Athens to Atlanta, from Atlanta practically to Chattanooga, from Atlanta to Macon, from Macon to Valdosta, Thomasville and Bainbridge, from Macon to Savannah, from Savannah through Macon to Columbus, and so I might multiply instances. The building of these great highways could be co-ordinate with the building of subordinate roads through the counties. If a portion of the convicts were required to work on the main highways

most of the counties would work the other portion of the subordinate roads."

* * *

Kansas.

Automobiles in Kansas have paved the way for a good roads movement wider, even, than the State itself. Early last year a proposition arose for the improvement of the old Santa Fe trail, running from Kansas City to Denver—the object being to make the thoroughfare "a good road for automobiles."

It is of interest to good roads builders everywhere to know that 300 representatives from counties along the trail met at Hutchinson to formulate plans for an improvement generally desired. The work progressed so well that in June an endurance run was made from Hutchinson to Pueblo—400 miles away.

It is estimated that during last summer 1,000 cars made the trip over the trail from Kansas City to Pueblo, and this year the improved trail promises to be a busy line of travel.

The automobile is doing great things for the road cause in Kansas and all over the nation its influence is being felt.

* * *

Mississippi.

Some time ago the word came from the faraway state of Washington that they were building roads out there out of straw, sand and clay and this at once called to mind the affinity that exists between straw, clay and sand as exemplified by the ancient method of brick-making. In Mississippi, where wheat straw is not so plentiful, an Orange county genius built an unusually good road of pine straw, of which the state has a large supply. This road has been giving almost perfect satisfaction, is durable, firm and gives a dry, usable road in all kinds of weather. The plan is meeting with favor in Duval and St. Johns counties, Mississippi, as prominent a newspaper as the Jackson (Miss.) Metropolis favoring the method. This paper advises counties that are unable to build costlier roads now to go ahead and build the best road possible with the limited means at hand. Any county in almost any part of the south, can build pine straw roads.

* * *

Texas.

In Texas interest in roads continues unabated, despite the war cloud on the Mexican boundary and the presence of about half of the United States army. The liveliest road organization in the Lone Star State is the Gulf Coast Good Roads Association, mention of which was made in Southern Good Roads last month. According to the Galveston News this organization is growing in strength and influence every day. A permanent organization has been effected and the cities of the region affected have put up the necessary cash to make things hum and the association is at work. Efforts are being made now to enlist co-operation all along the line for the good road that is building through Galveston, Harris and other counties to Beaumont, Orange, Port Arthur and Bolivar. In all the counties but one traversed by this road the work is under way and Liberty county is getting ready to vote bonds for the building of roads. That county will doubtless get in line and when the road is completed it will be 200 miles long. Another project which is attracting members of the association and others, is a good road from Galveston west to the Brazoria county line for a connection with a road in the county that in

its turn meets a road in Matagorda county, thus affording a straight line of good road from Galveston to Bay City and on to the southwest in the vicinity of Corpus Christi. This latter project is being urged in Matagorda and Brazoria counties, and while it will entail the building of a bridge over the Brazos River, it is a foregone conclusion that it will be done.

A meeting of committees from the various counties interested in this project to the southwest will be held in Bay City in a short time, at which an organization will be effected in several of the counties along the route, and these organizations will probably become a part of the Gulf Coast Good Roads Association.

Tennessee.

Tennessee continues to agitate the building of a good road across the entire length of the state, a distance of about 530 miles, connecting Bristol and Memphis. Governor Hooper is behind the proposition with all his youthful energy and enthusiasm. Two days will be set apart for the work and the people living close to the road will get together and build the road. Many thousands of men and teams are to be engaged and for two days the dirt will fly in great style. This road will surpass in length the famous highway across Iowa which was built in a day, 380 miles long.

A number of Tennessee counties made great gains in road building during 1910, but Shelby county probably lead the state. According to road statistics recently filed in that county, Shelby county expended the sum of \$423,684.30 on the building and repair of the county roads during the year 1910. This figure is the total sum shown in the annual reports of the county turnpike board and the commissioner of dirt roads as having been expended by these two departments, to which is added the sum of \$64,225.95, the estimated amount of work done by the five gangs of convicts worked on the roads by the county workhouse, as given in the report of the superintendent of the workhouse.

Other counties have done equally well, according to wealth and population and great things may be expected of Tennessee in the future.

New York.

On March 22nd bids were received by the state highway commission of New York for the construction of 275 miles of roads at a cost of \$3,700,000. Bids for these roads were to have been opened in January but the matter was held up by Governor Dix, who alleged carelessness and incompetence in making out the specifications. They were carefully examined by the state highway engineer and was found that while there was considerable extravagance that it would seriously delay the good roads work in the state to hold up the work longer and the governor decided to withdraw his objections. There has been graft, and a great deal of it, in building roads in New York and Governor Dix, the new chief executive, intends to put a stop to it.

Virginia.

In Virginia the greatest activity in road building has been noted during the past few months in the south west. Russell, Wise and Lee counties have voted bonds to the amount of \$1,339,000, while the entire state's amount of bond issues for roads amounts to only \$2,823,000. In commendation of this section of the state the Richmond Times-Dispatch, one of the leading papers of the south, said recently:

"South West Virginia has the rest of the state beaten to a frazzle on the good roads question. Yesterday, by a majority of five or six hundred, Russell county

voted a subscription of \$275,000 in bonds, for the building of good roads in that county. Wise county has already subscribed \$700,000 for the same purpose, with Lee county a respectable second with a subscription of \$364,000 to its credit. Tazewell county will shortly vote on the question of subscribing \$600,000 for good roads, and there does not appear to be any doubt that it will vote on the side of progress. With this subscription these four counties will have put up for good roads nearly \$2,000,000.

"There is no better test of good citizenship than good roads. They are the evidences of civilization. They spell prosperity for the people and the communities through which they run. Business cannot be conducted economically without them, and it is to the everlasting credit of South West Virginia that its people are willing to tax themselves for their own benefit without stopping to consider what proportion of the burden must be borne by the generations that are to follow. We wish that every county in this state would take knowledge of Russell, Lee and Wise counties and imitate their fine example."

In addition to the voting of bond issues there is great interest in the building of certain trunk lines through the south western part of the state. Mr. John W. Chalkley, president of the Wise County Good Roads Association, has originated a plan for the construction of an improved macadam highway from Big Stone Gap to Middlesboro, Ky. From Middlesboro it will be extended to Louisville, Ky., and Mr. Chalkley is trying to interest the people of Roanoke to the end that the road may be extended to that hustling city.

The state of Virginia has one of the liveliest highway departments in all the south and Capt. P. St. Julien Wilson is the head of it. He is the great dynamic force in the road building fever that has struck the Old Dominion and he is making things hum from the mountains to the sea and beyond the mountains. Last month the activity in Wise, Lee, Tazewell and other counties were noted in this department and it can be said that other parts of the state are just as wide awake as these counties. The Virginia Guide, the organ of the state school for the deaf and dumb, tells of the activity that is being shown in Augusta county. It volunteers the information that influential citizens of this county are circulating a petition asking that the county supervisors call an election to vote on a bond issue of \$1,000,000 for the purpose of macadamizing 300 miles of public roads in the county. A strong sentiment has developed in favor of the proposition.

For five years Augusta county has been building new roads, and the splendid highways already completed and in use have served as an object lesson to the farmers, with the result that every neighborhood is now clamoring for road improvement. Land values greatly increased, and real estate agents are busy. There has never been a time in the history of the county when the spirit of progress was so apparent. Evidences of prosperity can be seen in every section, and it is not confined to improvement of the highways but extends in other directions as well. Better farm buildings are being erected, new enterprises are springing up in the country villages, antiquated school houses have given place to modern structures, and iron bridges span every stream.

Augusta county is one of the largest and one of the richest counties in the state, and the can well afford to spend even the big sum proposed in building a network of perfect roads. It will be one of the best investments that could be made, and the benefits to follow will be lasting. No community which once en-

joys the luxury of good roads will ever again be satisfied with mere trails through gullies and mudholes.

* * *

Washington.

The people of the state of Washington are deeply disappointed in the work of the recent legislature. A number of good roads bills were presented, several having great merit and all of them were sidetracked. The same thing has happened this spring in several other states and the following stinging rebuke, taken from an editorial in the Seattle (Wash.) Times in which road conditions and road legislation in Kansas and in Washington are contrasted, is equally applicable in North Carolina and in other states:

In striking and direct contrast to the intelligent public interest in the good roads movement in Kansas are the decadent lethargy and supineness that

have characterized the attitude of the legislature of the State of Washington.

The so-called "solons" at Olympia squandered close to an hundred thousand dollars in their own salaries and other expenses at the session just closed, with hardly a tangible benefit to the people who had sent them there.

On the other hand, their neglect and indifference were amazing. In scarcely any particular was their disregard of the public weal more pronounced than on the subject of good roads.

It was all right to strike down the gates of the treasury for constructive thieves and buccaneers in a thousand and one vicious disguises; but at a time when the movement for good roads is literally as broad as the Nation itself the legislature of Washington did nothing whatsoever!

Good Roads Notes in Brief

Aberdeen, Miss., votes this month on a bond issue of \$25,000 for improved roads.

Greenville, S. C., contemplates issuing \$16,000 of bonds for street work.

Tishomingo county, Miss., is preparing to issue bonds for road improvement.

In Covington county, Miss., district No. 3 has voted bonds for roads and has employed Mr. R. E. Snowden, of Snowden, N. C., as highway engineer. He will have entire charge of the work. Districts one and two, in the same county, are preparing for bond elections.

Macon, Ga., will vote May 10th, on issuing bonds for \$100,000 for improving streets and roads.

Newnan, Ga., votes this month on issuing bonds for \$50,000 for street improvement.

Summerville, Ga., will vote April 30 on an issue of \$40,000 of bonds for road work.

Tarboro, N. C., will vote May 1 on an issue of bonds for \$25,000 for street work.

Houston, Tex., has let a contract for paving certain streets to the amount of \$35,000.

Kansas City, Mo., has awarded a contract for the construction of one and a half miles of concrete street at a cost of \$25,000.

Mobile, Ala., has let the contract for paving two streets at a cost of \$65,000.

Etowah county, Ala., is preparing to do a great deal of road work in the near future.

Rockingham county, Va., has \$35,000 available for immediate use on the roads.

Hugo, Okla., will pave 26 blocks with road asphalt.

At Lynchburg, Va., the city and the Southern railway are preparing to pave Jefferson street at a cost of \$70,000.

Baker county, Fla., is preparing to build a good road across the entire length of the county.

McCracken county, Ky., is asking for bids on graveling 21 miles of road in 1911.

The commissioners of McNeil township, Moore county, N. C., have decided to build a system of good sand clay roads in their township.

Putnam county, Tenn., has just closed a stirring campaign that resulted in the voting of a bond issue of \$100,000 for road improvement.

Sharkey county, Tenn., will start road improvement with \$50,000, for which bonds were issued recently.

Road Precinct No. 1, Caldwell county, Tex., will vote soon on a bond issue of \$50,000 for roads.

Anson county, N. C., has called an election for May

8 to vote on a bond issue of \$300,000 for building good roads.

Tazewell county, Va., will vote April 18 on the question of issuing bonds to the amount of \$50,000.

Birmingham, Ala., has awarded contracts for the laying of \$45,000 worth of bitulithic.

Hamblen county, Tenn., has awarded the contract for the construction of a road to cost \$15,000.

Newbern, N. C., has awarded contracts for the building of a number of brick paved streets.

The city of Roanoke, Va., has awarded contracts for the construction of macadam streets, gutters, sidewalks, etc., at a cost of \$180,000.

Three and a half miles of model shell road are being constructed at Tampa, Fla.

Tulsa, Okla., has awarded contracts for street paving in seven districts amounting to \$143,000.

Austin, Tex., is preparing to lay a mile of modern paving on five of its principal streets.

Beaumont, Tex., is preparing to do a great deal of street work. Part of the contracts for it have been let.

Dallas, Tex., is preparing to pave a number of streets, widen some of its thoroughfares and do a great deal of sidewalk improvement.

Hinds county, Tenn., has just let contracts for the construction of twenty one miles of fine gravelled roads.

Lynchburg, Va., is laying pavement on Wise street and other streets are to be improved in the near future.

Portsmouth, Va., is improving a number of its principal streets and is asking for bids on improving others.

The government is preparing to repair extensively the roads around the Washington Barracks in Washington, D. C.

At Birmingham, Ala., the board of revenue is preparing to build 15 miles of good roads.

At Wetumpka, Ala., the county commissioners are asking for bids for the construction of 30 miles of sand clay roads between Wetumpka, Elmore and Talladega, including drainage pipes and culverts. Bonds have been issued for \$170,000 and 200 miles of road will be built later.

Elizabeth City, N. C., will lay 40,000 square yards of paving on its principal streets.

Brazoria county, Tex., is preparing for a bond election to provide \$150,000 for road work.

A macadam road is to be built between Roanoke, Va., and Salem, Va., this summer under state supervision. It will cost about \$30,000.

Galveston county, Tex., will grade, regrade, pave with gravel, mudshell, or crushed rock and build culverts on the road from LaMarque to Texas city.

At Kings Mountain, N. C., a bond election is to be called in No. 4 township to vote on an issue of \$25,000 for road improvement.

Work is to begin soon at Baltimore on the construction of boulevards, sewerage system, etc., for a suburban project covering 4,500 acres of land. The system is to cost \$1,200,000.

Chattanooga, Tenn., will spend \$45,000 on street improvement this spring.

Pittsboro, N. C., one of the oldest towns of the state, took its first forward step last month in the voting of bonds for \$5,000 for street improvement.

Paris, Tex., has voted bonds for \$25,000 for street improvement.

East Baton Rouge Parish, Louisiana, will vote on a bond issue of \$275,000 for building good roads.

In Lamar county, Tex., Precinct No. 1, will vote April 22 on an issue of \$300,000 of bonds for road work.

Moore county, N. C., votes this month on a bond issue of \$100,000 for good roads.

Rapides Parish, Louisiana, is contemplating a bond issue of \$200,000 for the building of good roads.

Stonewall county, Tex., has awarded contracts for the building of six miles of good roads.

Jefferson county, Tex., has awarded a contract for four miles of grading on one of its principal roads.

Manatee county, Fla., has contracted for the construction of seven miles of good road.

Dallas, Tex., has awarded contract for the building of rock asphalt street to cost about \$75,000, and \$69,000 for bitulithic work.

Jacksonville, Fla., is preparing to do a great deal of paving, grading, etc.

Talbot and Caroline counties, Md., will build 83 miles of macadam road and one big steel drawbridge.

Hamilton county, Fla., is asking for bids to construct 30 miles of road.

Fort Worth, Tex., is asking for bids on the construction of 6,710,000 square yards of paving.

Hugo, Okla., will let contracts for paving 30 blocks.

Memphis, Tenn., will spend \$2,000,000 on street improvements during the next twelve months. About 36 miles of macadam street are to be improved.

Lauderdale county, Miss., will award contracts this month for the building of about 19 miles of good road.

At Washington, Va., the state highway department of Virginia is asking for bids on about eight miles of macadam.

Bridges and Culverts.

Paducah, Ky., is asking for bids on a bridge 360 feet long, to be built of reinforced concrete and to cost in the neighborhood of \$35,000.

At Shreveport, La., a bridge is to be built across the Red River which will cost about \$225,000.

Holmes county, Miss., is inviting bids for bridge across Harland Creek near Eulogy.

Brazoria county, Tex., will vote this month on an issue of bonds for \$100,000 to build bridges.

Southampton county, Va., is preparing to build several steel and concrete bridges in the very near future.

The city of Danville, Va., will construct a bridge across the Dan river 1,600 feet long and with a 20-foot roadway.

Spotsylvania county, Va., is asking for bids on four bridges.

King William and Hanover counties, Va., are asking for bids for the construction of a bridge across the Pamunkey river to cost about \$4,000.

At Pocahontas, Ark., a bridge is being built across the Black River at a cost of \$150,000. It is 1425 feet long.

A bridge is to be built across the Ocmulgee river at Macon, Ga., soon that will cost about \$160,000. Bids are being called for.

Bibb county, Ga., will vote May 10 on issuing bonds for \$200,000 to build bridges.

Lawrence county, Miss., will build a bridge across Silver Creek.

Contracts for twelve steel bridges for the North Carolina Interurban Co., ranging in length from twelve to 125 feet, will be let soon. The road is being built from Charlotte to Asheville.

Choctaw county, Okla., will vote April 18 on issuing bonds for \$120,000 for the construction of 21 bridges.

McMinn and Bradley counties, Tenn., have united to build a bridge at Charleston across the Hiawassee river. It will be about 400 feet long.

Memphis, Tenn., is asking for bids on a large amount of pipe and culvert work.

DeKalb county, Tenn., is considering building a bridge across Caney Fork at a cost of about \$12,000.

Nueces and San Patricio counties, Tex., are preparing to build a bridge across Nueces river.

A viaduct is to be constructed at El Paso, Tex., costing about \$65,000.

Jackson county, Tex., is considering building a bridge across the Lavaca river.

Southampton and Nansemond counties, Va., are preparing to build a bridge across Blackwater river at a cost of about \$5,000.

Mecklenburg and Gaston counties, N. C., are to construct a steel bridge across the Catawba river.

Ouachita county, Ark., is asking for bids for the construction of a steel bridge across the Ouachita river near Camden.

Four steel bridges are to be built across the Suwanee river near Live Oak, Fla.

Richland county, S. C., has voted bonds for \$75,000 to purchase the present traffic bridges across the Broad and Congaree rivers, or build new ones.

Two steel bridges will be built across the Brazos river in Brazoria county, Tex., one about 600 feet long and the other about 800 feet long.

Plans are progressing for the 1600-foot viaduct which is to be built in Houston, Tex. It is to cost \$500,000.

\$500,000 of bonds for good roads will be issued in Hamilton county, Tenn.

Permanent Culverts.

The culvert question for many years has been a hard one. A number of the metal culverts that have been on the market during the past decade have not given satisfaction. Of recent years, however, the metal culvert has been greatly improved by modern methods of manufacture, so that they are almost rust-proof and will last for many years beyond the life of the old-time metal culvert. The concrete culvert has also won wide favor and is growing in popularity. It remained for the Consolidated Expanded Metal Companies, of New York, however, to design a culvert embracing the best features of both kinds of culverts. This is the famous culvert obtained by the use of concrete, reinforced with "Steel crete" expanded metal. This style of culvert won instant approval when placed on the market and has been adopted by the New York State Highway Commission and included in its plans

and specifications for culvert work. This type of construction is also admirably adapted to short span bridge work and for bridge floors of all kinds. The company claims that this type of culvert is absolutely permanent and the cost is not unreasonably high. It would pay road builders to investigate the merits of this unusual type of culvert for the best is none too good for the class of roads that the highway engineer of today is producing.

A Bank Endorses Good Roads.

The First National Bank, of Moultrie, Ga., opens up a new field for helpfulness and usefulness on the part of the banks of the south. The following resolutions were adopted by the directors of this progressive bank recently:

We, the officers of the First National Bank, do hereby heartily endorse the movement made by the Chamber of Commerce to improve the roads in this county.

The First National is always eager to push any movement that will help and gratefully benefit the working people, and the deserving farmers of Colquitt.

During this good road movement, if at any time, the deserving farmer sees that it will be necessary to put up a new wire fence, build a new house, or improve his farm in any way, we stand ready to loan you the necessary money to make these improvements.

We will help you in every possible way if you are a customer of this bank, we are always glad to write your deeds and mortgages, and attend to all your legal business, and give you financial advice free of charge. All of our experience, all of our resources, and all of our knowledge is at the disposal of our customers.

It sounds very good that "Jacksonville is to be the Southern terminus of the national highway." This is as it should be, or, better said, as it should have been long ago. However, the Tropical Sun is pleased with the prospect, and perhaps in a way that is a little selfish, for when Jacksonville is that terminus, she can only hold it a short while with highway improvements continuing and forced with vigor and enthusiasm along the entire East Coast, until West Palm Beach has the chance to temporarily take away this glory, for she can only hold it a short while when Miami will say she is "it," only in turn to be soon after superseded by a point further south and that again in turn, until eventually the jumping off point or final limit and real terminus of the national highway north and south is reached. It is pleasant to have a good thing, but better still is the ability and willingness to share that same good thing. So Jacksonville, which has so much already, will gladly help in sending the terminus further and further south.—West Palm Beach (Fla.) Tropical Sun.

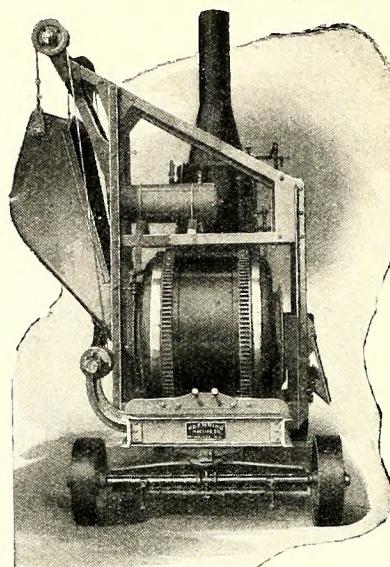
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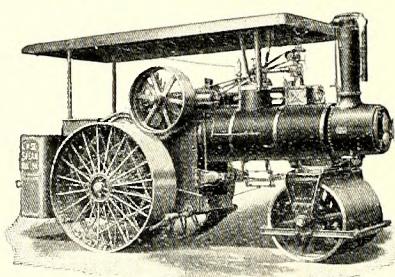
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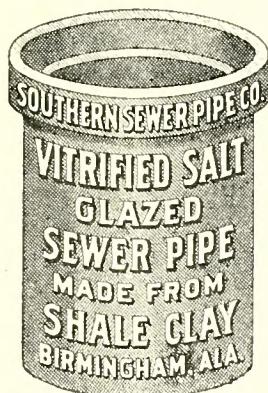


Price: Simple Cylinder Roller \$2200
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We Sell
Troy Dump Wagons and Dump Boxes

Send for our General Purpose and Municipal Tractor Catalog "H."

J. I. Case Threshing Machine Co.
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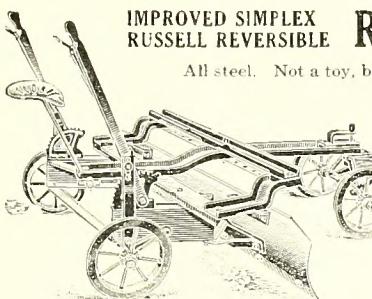


Double Strength Culvert Pipe

Vitrified pipe is impervious to moisture, and is everlasting. Write us for literature and prices.

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Southern Sewer Pipe Co.
Manufacturers
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Works like a sulky plow
operated by one man

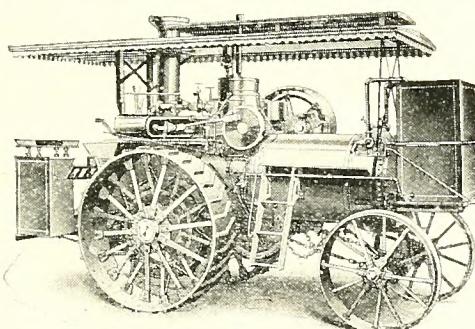
Arced Frame--No Clogging, four flanged wheels--No Skidding. The only two-horse machine strong enough for four horses in heavy grading. Weight 800 pounds. Not expensive. Full size polished blade 7 feet 2 inches. We make a full line of Road Bldg' Machinery



A RURAL ROAD GRADER AND DITCHER
will do your township road work and make ditches thru your low lands. Don't buy Road Graders or Road Drags before you have my catalogue.



JUMBO, CLIMAX AND CHIEF
STUMP PULLERS, CAPSTAN POWER DITCHING MACHINES, BOG LAND LEVELERS. Send for Catalogue of the machine that interests you.
C. D. EDWARDS, ALBERT LEA, MINN.



The Contractor Engine

Built for the Contractor, and peculiarly adapted to his work. Makes the Contractor independent of animal power and greatly reduces the number of men on the payroll. Runs forward and backward equally well. Finest power for pulling stone or dirt wagons; and hauls them in trains easily. Hitch it to the largest graders, and it pulls them right along without trouble.

When it comes to pulling rooter plows, there is nothing better. The hardest kind of a street or road is easy to work for this engine, if you can get a plow strong enough to stand up to the work.

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Our twin cylinder machine runs the smoothest of any traction engine built. Details and specifications are given in our special catalog for Contractors; sent on request.

The Huber Manufacturing Company
607 Center Street MARION, OHIO

Novel Method of Spreading Good Roads Gospel.

A novel but effective method of forwarding the good roads movement has been adopted by the Lancaster, Pa., Automobile Club, which has the school children of the county studying the good roads question. The high schools of the towns and villages of that county have graduation exercises about this time of year and each graduate delivers an oration. For the best three commencement essays the club has offered generous cash prizes, making it worth while for the pupils to compete. In gathering the ideas for their essays the scholars will talk good roads with their elders exciting the interest of the latter in the subject, in declaiming their essays the scholars become preachers of the good roads gospel addressing crowded audiences, and finally the local newspapers publish reports of the commencements containing the good roads addresses, completing the cycle of good roads publicity. As the children of today are the men and women of tomorrow it is proper they should turn their attention now to the problems in the solution of which they will live to participate.

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Come—follow the arrow 'til you join the merry throng of palate pleased men and women who have quit seeking for the one best beverage because they've found it—

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Real satisfaction in every glass—snap and sparkle—vim and go. Quenches the thirst—cools like a breeze.

Delicious—Refreshing—Wholesome

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THE COCA-COLA CO.
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Whenever you see an Arrow think of Coca-Cola

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Everything of service in the Camping Line. "Quality of material, unexcelled workmanship---then the lowest price consistent therewith" our motto.

M. D. & H. L. SMITH CO., Dalton, Ga.

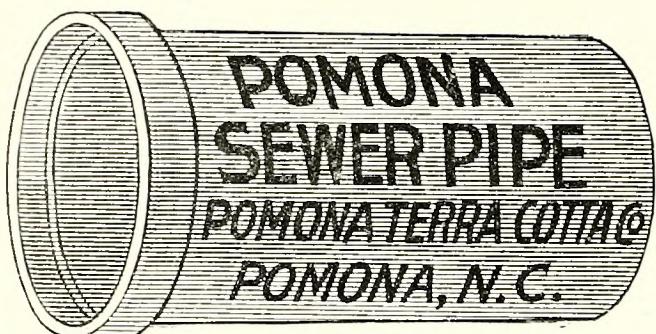
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ROCK DRILLS**

Makers of the Rock Drill that can be "cleaned up with a sledge hammer" and "wiped off with a scoop-shovel" and yet "stay with you."

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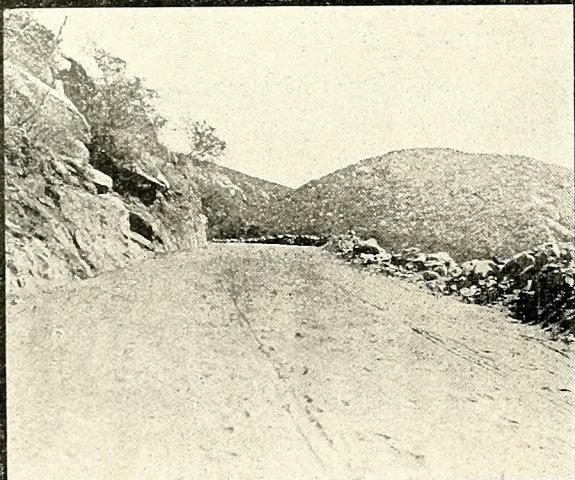


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Manufacturers of Sewer Pipe, Flue Linings, Wall Coping, Well Tubing, Farm Drain Tile, Etc.

Good Roads can be Built at a Reasonable Expense in Mountainous Country when



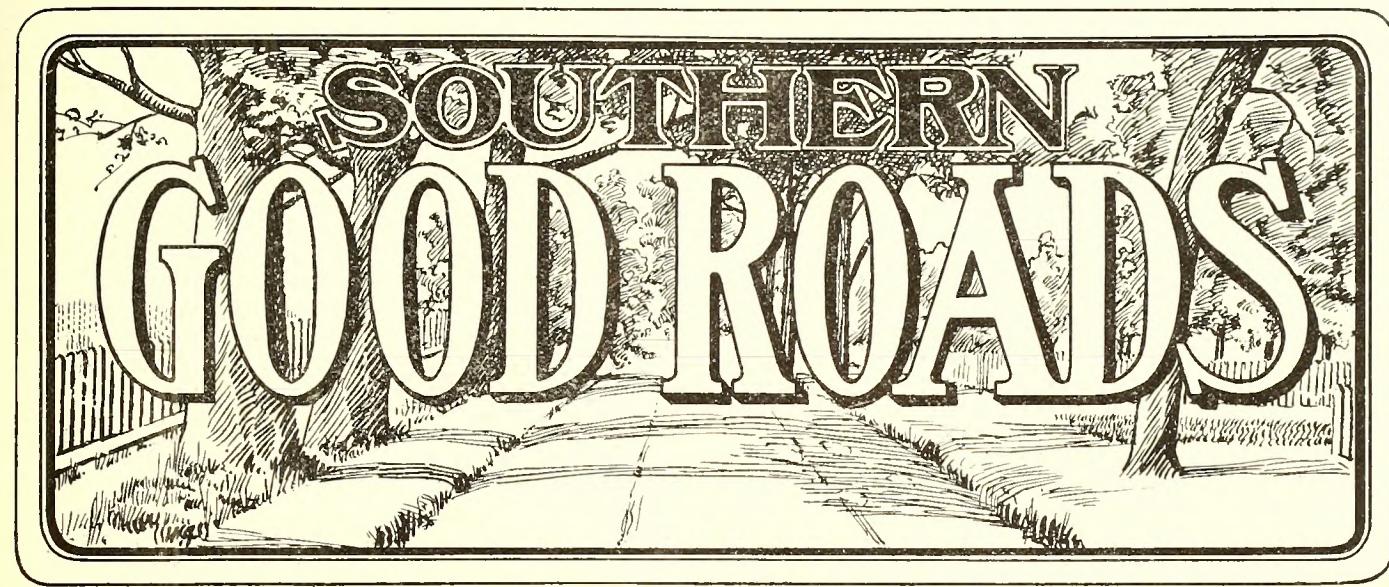
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MONOBEL No. 1
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are used
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Lexington, N. C., May, 1911

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Some Facts Concerning Concrete Culverts

By HON. CHARLES H. HOYT, Superintendent of Road Construction, United States Office of Public Roads

In the November, 1910, issue of this paper an article announced for the first time, the organization by the U. S. Office of Public Roads of a Division of Highway Bridge Engineering. A bulletin, now in the hands of the printer, on the subject of Highway Bridges and Culverts will soon be ready for distribution, and may be had free of charge by addressing the Director, Office of Public Roads, U. S. Department of Agriculture, Washington, D. C.

The cut accompanying this article is made from a working drawing for a concrete culvert whose opening is 2 feet wide by 2 feet high, and having a clear width of 24 feet between the parapet walls. This opening is about as small as it is practical to build and in point of numbers perhaps more concrete culverts are needed of this than of any other size.

Materials Required.

The materials required for concrete culverts are Portland cement, clean, sharp, coarse sand, crushed stone or screened gravel, steel rods or expanded metal, and clean water.

A good grade of Portland cement may now be purchased in almost any city, or direct from the manufacturers in carload lots. It is packed in wooden barrels or cloth sacks or paper bags. One barrel of this cement weighs about 400 pounds. One sack or bag of the same cement weighs about 96 pounds. Four sacks or bags of cement are considered equivalent to one barrel. The cloth sacks may be returned, and about 6 cents each is refunded for those returned in good condition. One carload of cement contains from 100 to 200 barrels, depending upon the size of the car. Portland cement is required for this class of work for the reason that it will harden and retain its strength under water.

The sand should be clean, sharp, coarse, and practically free from clay, loam, or vegetable matter.

The crushed stone should be hard and tough in quality and about the size of hens' eggs for the side walls and bottom of culvert. Somewhat smaller sizes should

be used for the reinforced concrete slab forming the top of the culverts.

If gravel is used instead of crushed stone, great care must be exercised in its selection to secure that which is free from clay, loam, or vegetable matter, and in which the stone is of durable quality. Most gravel must be screened to remove the excess of fine material and to get such sizes that may be used in suitable proportions with sand and cement to make a good concrete. Some gravel that is not suitable for use after screening may be made so by washing.

Proportioning Materials.

The proportions of materials to be used in making concrete vary with conditions and requirements. Those recommended for the floor and walls of culverts are 1— $2\frac{1}{2}$ —5. That is, one part by volume of Portland cement, $2\frac{1}{2}$ parts sand, and 5 parts crushed stone or screened gravel.

The proportions recommended for the top slab are 1—2—4. That is, one part Portland cement, 2 parts sand, and 4 parts crushed stone or screened gravel.

Mixing.

It is important that the materials be thoroughly and evenly mixed. Machine mixing is best, but it can be done well by day labor using shovels and a mixing board about 10 or 12 feet square. A good method to follow is to spread the amount of sand required for one batch on the mixing board, cover it with the required amount of Portland cement, and turn with shovels until thoroughly mixed while dry. Then add water and mix into mortar, after which the required amount of stone is spread over the mortar, and the whole mass turned at least three times with shovels or until thoroughly mixed.

The concrete is then ready to be deposited in the forms in horizontal layers from 6 to 8 inches in depth, and should be well tamped to compact it, and then left to harden.

Plans for other sizes of culverts made by the Divi-

sion of Highway Bridge Engineering may be had, together with copies of the following blank forms upon which application may be made for an engineer to make an inspection of locations or to superintend the construction of concrete culverts by addressing the Director, U. S. Office of Public Roads, Washington, D. C.

APPLICATION FOR BRIDGE ENGINEER.

Office of County of
P. O. Address Date
To the Director.

Office of Public Roads,
Washington, D. C.

Sir:

Application is hereby made for the detail of a Bridge Engineer to confer with the undersigned and give advice concerning plans for and construction of proposed bridges and culverts in this (town, county, or state)
.....

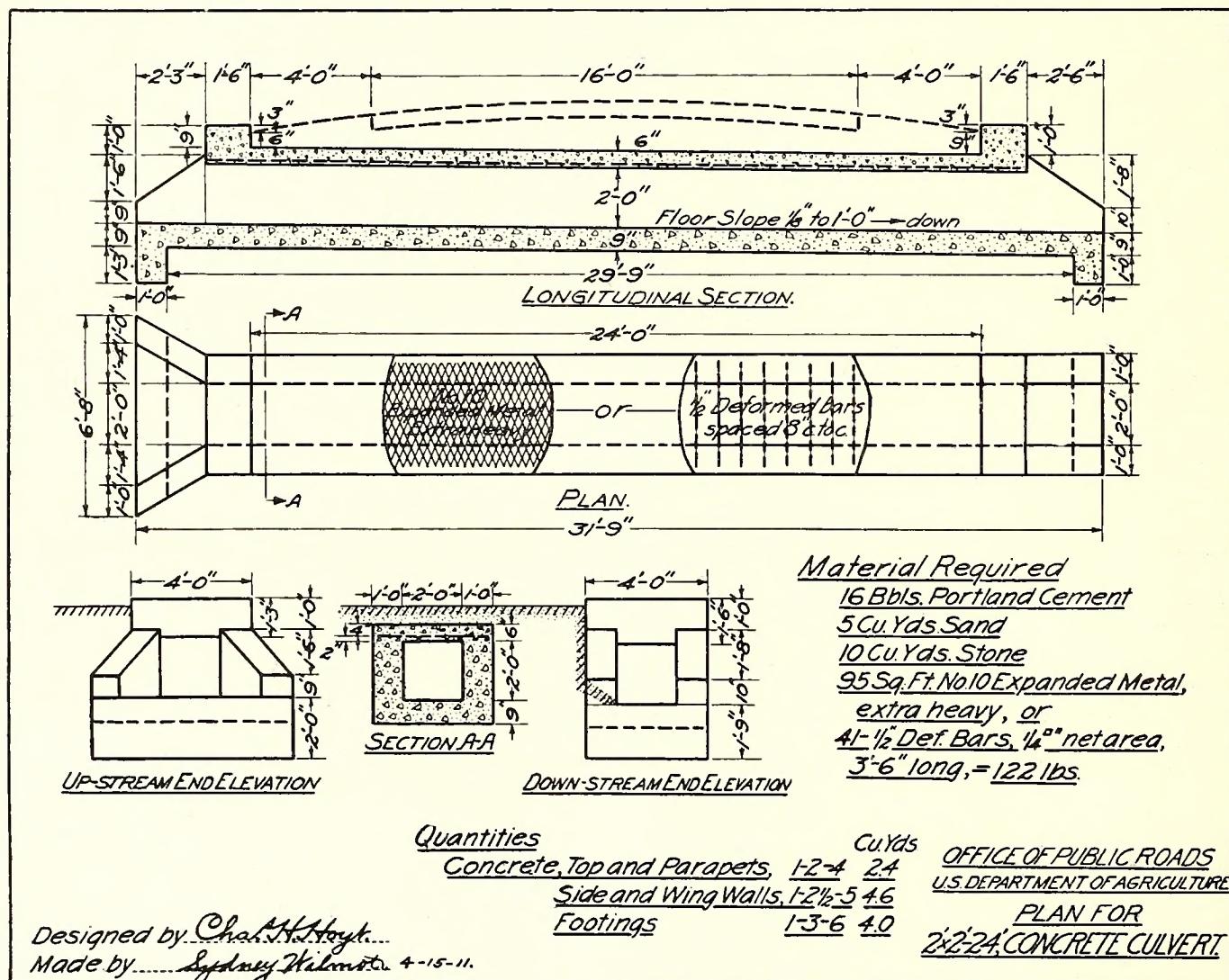
Culverts.

5. No. Culverts proposed Approximate span of each
6. Character of natural foundation
7. What funds are available for proposed work

We will furnish, or cause to be furnished, transportation and assistance necessary to enable the bridge engineer of the U. S. Office of Public Roads to make an inspection and get necessary measurements of locations for proposed bridges and culverts. We will also provide subsistence for such engineer while he shall be engaged upon this work.

Signature of local
Officials having legal
control over proposed
work.

See explanation.



Bridges.

No.

1. No. bridges proposed Approximate length of each
2. Approximate normal depth of water in stream
3. Kind of bridges desired (concrete or steel)
4. Character of natural foundation

Explanation.

The information called for in this application is approximate only and intended to give some general idea of the present conditions and magnitude of the proposed work.

The salaries and traveling expenses of engineer to and from the place of assignment will be paid by the Office of Public Roads. The officials making this application must furnish meals and lodging for the en-

gineer, and such livery or other transportation as he may need to execute his work expeditiously.

After such examination has been made, the engineer will recommend such type of construction as he considers practical and economical. If such recommendations are approved, the engineer will prepare free of charge such plans and specifications as are required to complete the work. Where conditions require and warrant the assignment of an engineer inspector during construction, such inspector will be assigned, free

of charge, except for meals and lodging, while engaged upon such bridge or culvert construction.

By natural foundation the meaning intended is the nature of the material upon which the abutments or piers will rest, such as sand, clay, quick-sand, mud or rock.

It is important that all construction work shall be done thoroughly and well. Where the work is of such magnitude that this office deems that an engineering inspector is necessary, plans may be withheld until arrangements can be made to assign such inspector.

Public Roads---Their Beneficial Results and How to Attain Them

By DR. JOSEPH HYDE PRATT, State Geologist

INTRODUCTION.

A study of the problems connected with the development of our nation has shown that we take first rank in civil government, manufactures, commerce, and in the world's affairs generally, yet, improved public road construction, the one phase of our American life upon which depends more than any other the certain prosperity and social comfort of a large majority of our citizens, has been neglected to a degree that is almost beyond the power of conception.

Our wisest statesmen have for several years been attracted by the question of transportation, and of the three important methods of transportation, railways, water-ways and roads, the two former have received the bulk of the consideration of our statesmen, and yet I believe that in the end the public road is the most important, for the reason that at least 90 per cent of the freight must first be hauled over them.

The question of the improvement of our public roads is becoming one of the more important ones of the day, and the cry is going up from all over this country to the State Legislatures and to Congress for better public roads. It is not only a county and state question but it is becoming a national one, and it is bound to receive the careful consideration of all who are interested in the development of the state and county.

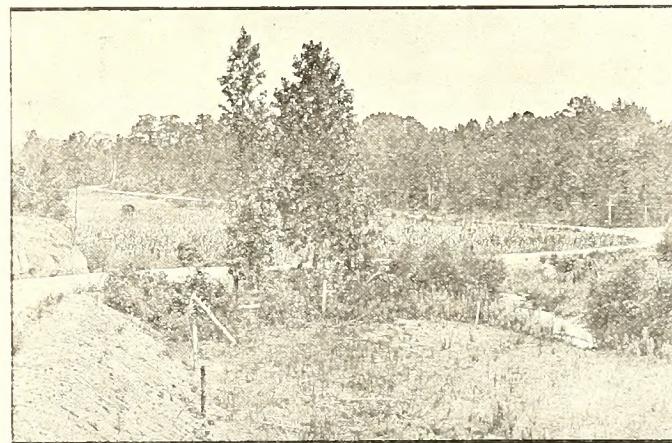
When railroading was first begun in this country many persons had the idea that there would be but little use for the public road in those sections of the country that were traversed by the railroad. Time has demonstrated, however, that railroads are simply the main arteries of travel, and public roads are the veins, each being a necessary part of the other in our system of transportation, and that without the public roads the railroads would fail in accomplishing what is required and demanded of them.

Agricultural products are a vital necessity of every country and must be provided, no matter what else has to be given up. The magnitude of their production in the south is not equalled either in value or in tonnage by the products of any other industry. Nearly all agricultural products have to be carried for at least a small distance over our public roads, and the cost of this transportation has to be deducted from the value of the agricultural product to the farmer who produces it.

Improvements in railway transportation facilities are approaching a high state of efficiency, while the public highways have in many states been greatly neglected. The people are, however, now turning their attention to the question of the improvement of public

roads, and, although this awakening has come rather late, the people of the south will attack it with the same force and vigor that they have taken up other questions of vital importance to the state and to the nation.

In North Carolina the good roads movement has spread to such an extent that now it is not "Do we want good roads?" but "How can we obtain good roads?" Of the 100 counties in the state containing approximately 50,000 miles of public roads, a very large majority of them have given expression to their interest in good roads by having bills introduced at the last two sessions of the legislature relating to the improvement of the public roads in their respective



Sand Clay Road, Franklinton Township, Franklin County, North Carolina

counties. This does not mean, however, that all these counties are constructing macadam roads or even good graded roads but that they have begun to realize the need of good roads and are making an attempt to remedy the evil of poor roads.

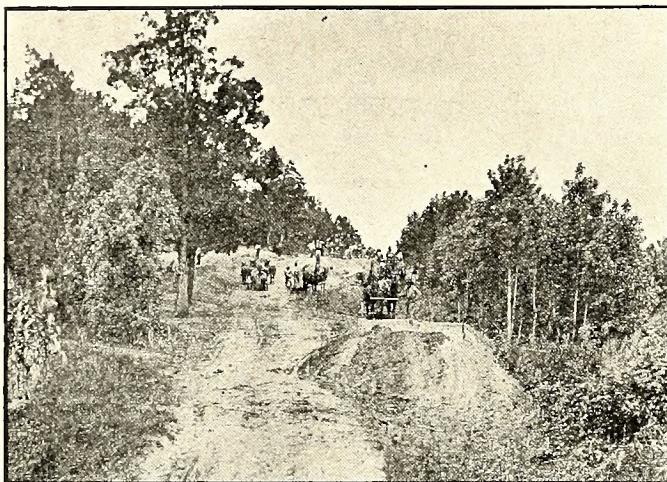
I wish to review briefly the practical or beneficial results to be derived by a community from the construction of good roads and why we cannot afford not to have them. As you will notice, the benefits apply largely to the rural sections, rather than to the incorporated towns and cities, and it may be well to state here that the money raised by bond issues, authorized by counties or townships, is in nearly every case to be spent for the construction of improved roads outside incorporated towns and cities.

Beneficial Results of Good Roads.

One of the chief beneficial results from good roads is that the farmer, fruit-grower, trucker, and others will be able to economize time and force in the transportation of products between country and market. The distance a farmer lives from market is not a question of miles but of the roads he must travel over to reach that point. How many hours and how many horses does it require to haul a load to market? When thus measured, ten miles of good, smooth highway are not as long as a few miles of mud and stone.

Let me illustrate this further. Two men were discussing the respective merits of their farms. One said, "I am only three miles from the market while you are five." "Yes," said the other, "but my five miles is over a hard graded road over which my two horses can easily haul two tons, while your road is hilly and rough and you would not think of putting more than $\frac{3}{4}$ of a ton on your wagon."

Farmers are realizing more and more that the distance they live from market is measured in time and not in miles.



Showing force of 34 mules with hands at work building Sand Clay Roads in Franklin County, Between Franklinton and Louisburg, N. C.

It will be easily seen that any reduction in the cost of marketing a product is to the advantage of the state, for if the producer does not make the difference, the consumer will; and it should not be and it is not difficult to convince the town and city man that he is directly interested in the construction and maintenance of good roads in the country. If he can be convinced of this fact, he will be willing to be taxed that improved road construction may be carried on in every part of the county of which he is a resident. Wherever improved roads have been constructed, they have demonstrated in a very short time their value to the community and to the state and have shown conclusively that they are the means of saving many dollars a year to the farmer. Over many of the public roads of the south it is now impossible for a farmer to haul more than half a ton. It may be that a considerable portion of the road between him and town may be a fairly good road over which he could easily haul a ton; but there are too many heavy places and grades on the roads over which it is impossible to haul over half a ton. Consequently, it is necessary for him to load his wagon for these rough, heavy places and not for the good places. If the farmer is not over 8 miles from the railroad, his team can make a round trip in a day if the roads are not too muddy and there are not too heavy grades. If his team is worth \$2.50 per day, it

has cost him at the rate of 62½ cents per ton for each mile. On the railroad it can be shipped to almost any point that the farmer desires for 1-50 to 1-100th of the rate which it has cost him to bring it to the railroad. This is because the science of transportation has been highly developed in connection with railroading and almost entirely undeveloped in connection with the public road.

As public road improvement goes on the farmer will find that he can begin to haul from two to four times as much per load as formerly, and in $\frac{1}{4}$ to $\frac{1}{2}$ the time, thus reducing the cost per ton per mile from $\frac{1}{4}$ to $\frac{3}{4}$ of what it cost him over the poor road. As we know there is but little chance of reducing the railway transportation charge on agricultural products, but there is a splendid opportunity in nearly every county of North Carolina to reduce the cost of the public road transportation charge on these products.

Estimated Cost of Transportation by Horses and Wagons, Hauling One Ton a Distance of One Mile on Different Road-Coverings.

On iron rails	1.28 cents
On asphalt	2.70 cents
On stone, paving, dry, and in good order..	5.33 cents
On stone, paving, ordinary condition	12.00 cents
On stone, paving, covered with mud.....	21.30 cents
On broken stone road, dry, and in good or. 8.00 cents	
On broken stone road, moist, in good order10.30 cents	
On broken stone road, ordinary condition.11.90 cents	
On broken stone road, covered with mud.14.30 cents	
On broken stone road, with ruts and mud.26.00 cents	
On earth, dry and hard.....	18.00 cents
On earth, with ruts and mud.....	39.00 cents
On gravel, loose	51.60 cents
On gravel, compacted	12.80 cents
On plank, good condition.....	8.00 cents
On sand, wet	32.60 cents
On sand, dry	64.00 cents

From a consideration of these figures of the cost of hauling a load of one ton a distance of one mile over a level road, it will be seen that it costs more than twice as much to haul this load over the best dry dirt road as it does to haul the same load the same distance over a macadam or sand-clay road and five times as much to haul it over a moderately muddy dirt road, and eight times as much to haul it through dry, deep sand. Unfortunately we cannot make all our roads level, as the topography of North Carolina varies from sea level to over six thousand feet. It is therefore necessary that most of our roads have some grade to them. In our road construction, however, we should make the grades just as low as possible, in as much as every per cent of grade greatly increases the cost of transportation. At the present time, the many steep hills on the roads through the middle and western counties of the state, and a few in the eastern counties are a very serious drawback to travel and a very heavy item of expense in transportation of farm products. This fact becomes very apparent when we stop to remember that the weight of the load which a team can haul from country to market is limited, not to what it could haul over a good part of the road, but to what it can haul up a certain hill over which the road passes, or across a certain muddy flat through which the road may lead. I want to show now what the maximum load is that a horse can haul over the best macadam road having different grades.

Load a Horse Can Draw On Different Grades on The Very Best Macadam Roads.

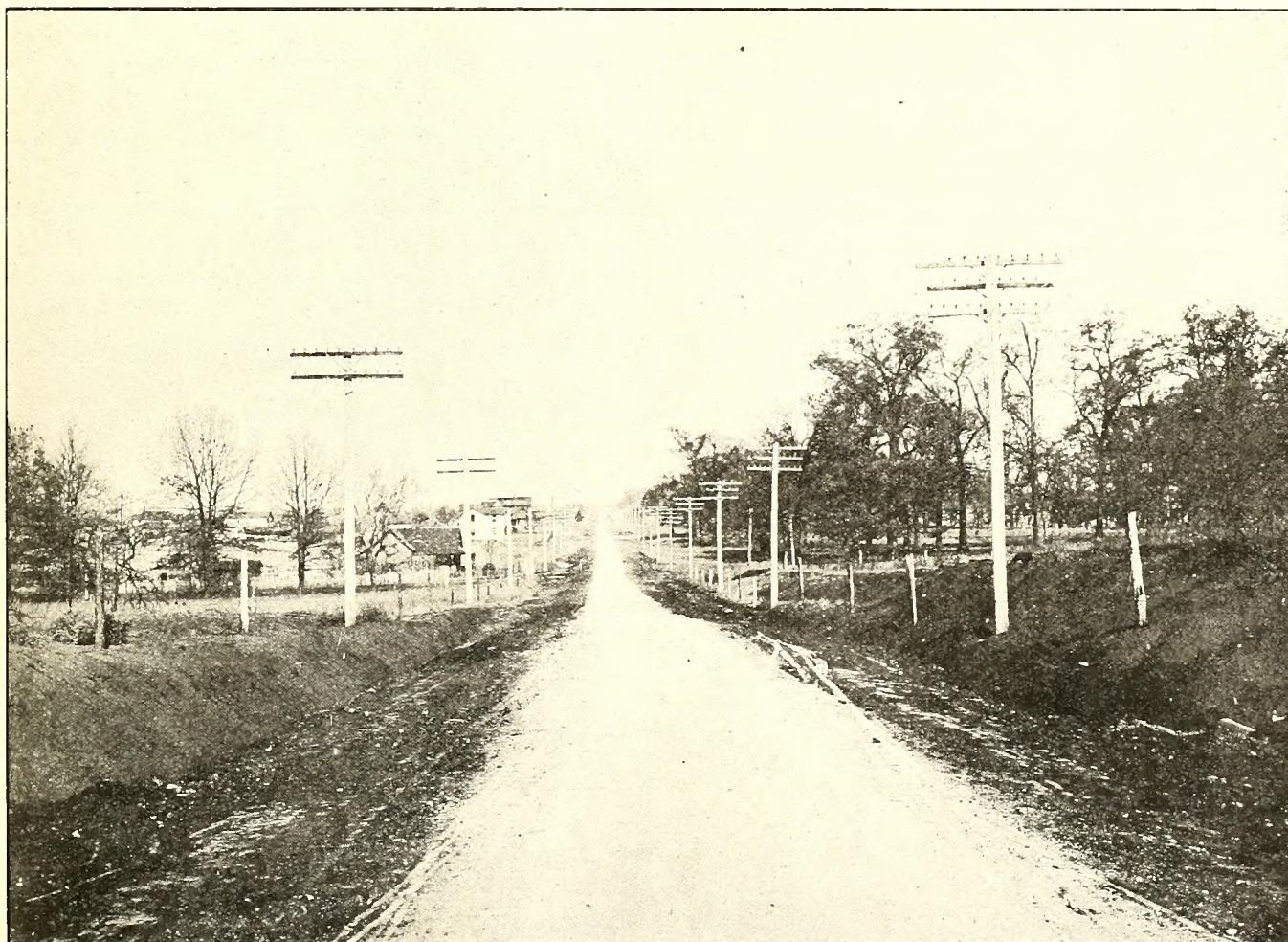
Rate of Grade, feet per 100 feet.	Maximum Load in Pounds which a horse can haul.
Level surface, best macadam	6,270
1 foot rise in 100 feet	4,145
2 foot rise in 100 feet	3,114
3 feet rise in 100 feet	2,486
5 feet rise in 100 feet	1,800
7 feet rise in 100 feet	1,367
10 feet rise in 100 feet	1,030

These figures show that an average horse weighing twelve hundred pounds can haul six times as much on a good level road as he can haul up a hill which rises ten feet in a distance of one hundred feet, and I might say here that such hills are not at all uncommon in the middle and western counties; and they also show that on such a steep macadam road it requires as much force to haul the load one mile as it would to haul the same load six miles on a level road.

There is another feature of our public roads that is adding considerable expense to transportation, and that is the unevenness of the surface of the road. On the surface of many of our country roads we will observe small to large stones, ruts, mud holes, sand, etc., and all these when present are adding considerable to the cost of transportation. Let me illustrate; if the wheel of a wagon rests on the smooth, hard surface of a good macadam or sand-clay road, it does not sink in

to the surface and has no obstacle in front of it so that a minimum amount of force is required to pull the load forward. If, however, there is a stone in front of the wheel it is necessary for the horse, before he can move forward, to pull, not only the load but he must also actually lift $\frac{1}{4}$ of the entire weight of the load to the top of the stone, if the vehicle has four wheels and one half the total weight of the load if it has two wheels. Take a winter time dirt road, where the wheel has sunk in mud half way to the hub, or a heavy sand road, where the wheels are sunk from four to six inches in sand, before going forward the horse must either lift this wheel out of the mud or sand, in which case he must not only lift the entire weight of the load, if all the wheels are in the mud or sand, but he must also lift an indefinite weight of mud and overcome a considerable amount of friction between the sides of the rim of the wheel and the mud or sand into which the wheel has sunk, before he can raise the vehicle on the hard surface again.

2. Another advantage that improved roads will give to a community is that farmers will be able to take advantage of market fluctuations in buying and selling; and to take advantage of any demand that may arise for any of their products. An up-country town needed fruits and vegetables to supply its market, which was bare, and such stuff was selling at a high price. Farmers living within only a few miles of this town had apples, potatoes, cabbage, etc., which were spoiling on their hands and they were greatly in need of all the money they could get for these products. And yet, it



Macadam Road, Near Atlanta, Georgia

was just about as hard for the farmers to carry their goods to market over the boggy clay hills as it would have been if there had been a very wide river with nothing but a little birch bark canoe to cross in. Who suffers in this case? The consumer suffers just as badly, as the farmer. Both have to pay the penalty for the bad roads. This is not the only instance in which both lose; it is so nearly every year.

A few years ago a cotton grower held his cotton for a predicted advance in price. He was justified in doing this as cotton went to twelve cents but the cotton grower was unable to take advantage of this good price as he was unable to haul his cotton to market on account of the muddy condition of the roads and he was not over five miles from town. What he lost would have been sufficient to have paid not only his road tax but all his taxes for many years.

3. There is a third practical result from good roads, regarding which most of our people have paid but little or no attention, and that is the saving in the wear and tear on horses, harness, and vehicles, and the sav-

to the state by a system of improved roads. These estimates will apply just as much to any other southern state.

With the graded roads there is no over-straining of horses, there is a minimum amount of wear and tear on harness and wagon, and there is no day in the year but that the roads can be traveled.

4. The fourth benefit which our rural communities will derive from improved public roads is in regard to education.

This advantage that the people of a county will derive from good roads cannot be too strongly emphasized. Every fair-minded man desires to give his children and the children of his neighbors better advantages than he himself enjoyed. And wherever good roads make it possible, it is now entirely feasible to substitute for a little schoolhouse of one room and one teacher, a consolidated or graded school with half a dozen rooms and half a dozen teachers. The schoolhouse of one room and one teacher was good, but the graded school of half a dozen rooms and half a dozen teachers is vastly superior, and we want to secure that for the children in all our counties.

It doesn't cost as much to build a schoolhouse of half a dozen rooms as it does to build six schoolhouses of one room. Six teachers working together can do vastly better work for the children than one single teacher who has to teach children of all ages from the cradle to the voting age. Instead of having twenty, thirty or forty children of different ages in one school so that the community spirit is an impossibility among them because of the diversity of age and of the difference in attainments, hundreds of children can gather into this graded school, where class spirit and community spirit will thrive and good teaching abound.

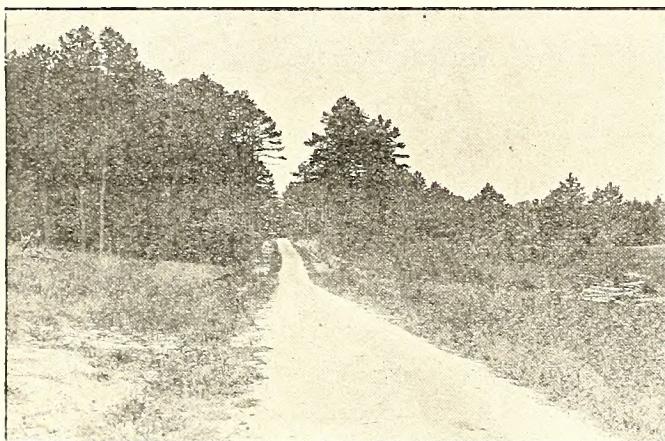
In the larger school there will be the library and many of the people of our rural districts who are longing for good literature will be able to obtain it.

The consolidated or graded school is dependent upon good roads. Education and good roads are two propositions that mark our advance in civilization. One begets the other. Educate people and they will build good roads. Build good roads and the people will educate themselves.

5. Rural free delivery will be extended as good roads are constructed and it is practically dependent upon good roads, for with the construction of good roads there will be an increase in population and of the earning capacity of the adjacent farms, which will mean a greater amount of mail matter to be delivered. This is emphasized in a report of the Postmaster General who said: "The requirement precedent to the establishment of rural delivery is to be a possible patronage of 100 families on a standard route of 24 miles; that the road be kept in good condition unobstructed by gates and with all streams fordable at all seasons of the year." Many routes have been threatened with discontinuance if the roads over which the rural mail carrier had to travel were not put in better condition. But few who have had the benefit of rural mail delivery want to see the routes given up and those who do not have rural delivery want it. It must be remembered however that the routes will follow good roads.

6. Another way in which good roads will be of great value to a rural community is the fact that the market value of the real estate situated on or close by a macadam or other improved road will be enhanced in value and in many instances properties which could not be sold even at a low figure have found a market when they have been connected with the neighboring town or city by a hard surfaced road.

Good roads will add more to the value of farm prop-



Sand Clay Road in Franklinton Township, Franklin County, Between Franklinton and Henderson, a link of the Capital to Capital Highway.

ing in time of both men and horses, which is lost on account of poor work. One who has not estimated the cost to our farmers in the repairs to harness and vehicles, due to heavy, rough, and muddy roads will be surprised at the enormous sum to which this amounts. Little thought is given to how many days in the year we have to leave our horses and mules standing in the stables on account of bad roads. The following estimates regarding this loss in North Carolina has been made by the Geological Survey of North Carolina.

Loss on account of the cost of feeding, and loss of time by the 134,000 country horses and mules during four weeks of impassable roads, etc. \$1,600,000

Loss, on account of bad roads, of the time and expenses of maintenance of 210,000 country horses and mules; 105,000 wagons and horses, and wages of 105,000 teamsters, during one month. \$3,948,000

Loss, on account of bad roads, of the services and expense of feeding 25,000 town horses, and services of 12,000 town horses and services of 12,500 teamsters, and wear and tear on 12,500 wagons and harness, all of which could be saved by having good roads and streets. \$440,000

Total. \$10,519,000*

*These estimates were made some years ago and the loss now is undoubtedly at least \$11,000,000 per year.

The aggregate of these several items gives a grand total of over ten million dollars, which sum the people of the state of North Carolina lose annually on account of bad roads, and which sum might be saved annually

erty than all other public improvements put together. The improvement in prices at which lands are selling along improved roads wherever they have been built is from 3 to 10 times their former value. If this is so, or if we are sure property will even double in value, should we not improve our principal highways at the earliest possible day?

The states are interested in increasing the earning capacity of farm lands as it means greater revenue to the state. Railroads are also interested in the construction of good roads in our agricultural districts, because they increase the facility by which the farmer can keep in touch with the rest of the world commercially.

Just a word, in regard to this increased value of lands that are on improved roads. The value of a farm is dependent upon the income that can be derived from it, and it is a well established fact that the farms on improved roads can derive incomes from $1\frac{1}{4}$ to 4 times as much as farms that are isolated from good road connections with town and market, and in a number of instances when the improved road has been constructed by the farm, the farmer has been able to raise and market products that it was absolutely impossible for him to do before the road was constructed.

7. Tourists, capitalists, investors, and others visiting any section of the south will be much more favorably impressed with the financial possibilities of any manufacturing enterprise, or the commercial value of any farm or timberland by driving to them over good roads. If these same places have to be visited over poor roads, they will lose more than half of their value in the sight of the prospective investor, as his thoughts have been so entirely taken up with the bad road over which he has been compelled to travel.

The Southern Appalachian Region has been most fortunately and richly supplied with those natural attractions that are demanded by tourists; but we lack the one great necessity that will make these natural attractions available to the tourist, namely "good roads." The tourist trade is a most vital asset of many European countries, and the American tourist is adding a very large amount to this income of those countries. A German statistician gives these figures regarding the value of the tourist trade.

Switzerland entertains during the year 3,000,000 visitors, who spend \$30,000,000. Italy, the Riviera, and Spain between them receive \$60,000,000 from their visitors. The various great capitals receive \$25,000,000 by entertaining their visitors, 900,000 of whom visit Paris, 600,000 visit London, 500,000 visit Berlin, and 350,000 visit Vienna, etc., over the continent. The sea-side and lake resorts receive upwards of \$16,000,000 from their visitors.

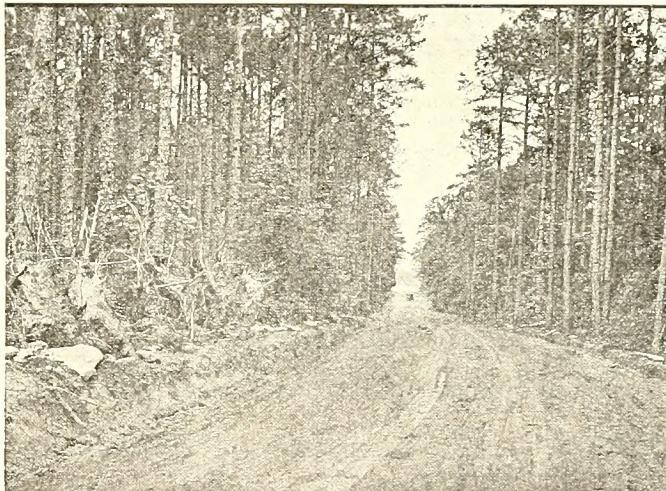
The interior districts of England, France, Italy, Switzerland, Germany and Holland are all accessible, even to the most remote villages over roads with hard surfaces, and this accounts in part for the popularity of these countries to the tourist.

The Southern Appalachian Mountain region should be attracting hundreds of times as many tourists as it is doing at present. The tourists want to come and drive and motor through this section but we have failed to give them the good roads that makes this possible.

Considerable thought is being given at the present time, by public spirited men in the south as to the possibility of the construction of a system of improved highways extending north and south, east and west, all over the Southland not only for the advantage of tourists coming into the south but also that our own

people may be able, with greater facility, to reach different portions of the southern states. We want the mountains connected with the seashore, and we want all the beautiful and scenic sections of the Southern Appalachian Mountain accessible at all times of the year; we want the points of historical interest accessible by improved roads, so that any one who wishes may be able to visit these places. There is, perhaps, no one thing that will preserve the history of the south to such a great extent as making the historical points accessible to the tourist, which will mean that they will be constantly written up.

Coaching and automobiling for pleasure is not a fad of short duration, it is a form of pleasure that will be in vogue for generations and generations. Such pleasure trips, however, will not be taken over poor roads, but parties will select those sections of the country that are traversed by good roads. When we have our system of good roads throughout the south we should be able to attract tens of thousands of tourists into the state that are now going to the White Mountains of New Hampshire, the Berkshire of Massachusetts, the Adirondacks of New York, and to Switzerland, Northern Italy and France.



Sand Clay Road in Franklinton Township, Franklin County, North Carolina.
This Shows portion of 7 mile link between Franklinton and Louisburg

From a business standpoint it would be the most profitable investment to construct these roads, if only for the benefit of the tourist, in as much as the money which they would bring into the sections traversed by the roads would in a very few years more than pay for the whole cost of construction.

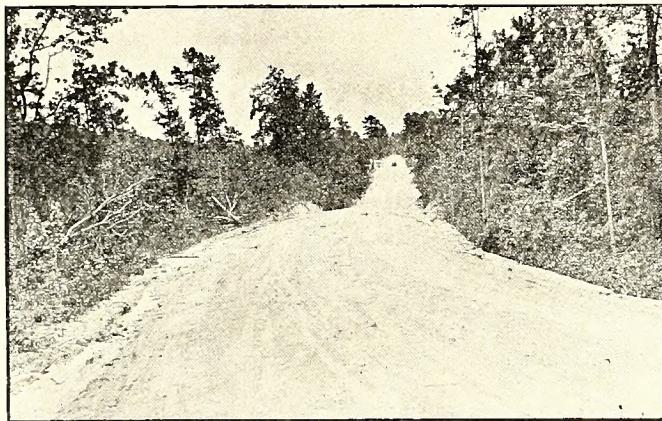
8. The state of North Carolina is at the present time extremely interested in the subject of immigration and, through its several departments, is making considerable effort to bring certain classes of European and American immigrants into the state.

It is not the desire of the state to simply obtain an influx of labor, but to obtain an influx of home seekers to become citizens of the state and at the same time furnish the kind of labor that is needed. We desire the better class of home seekers and these will want and demand school facilities for their children and good roads to connect them with town and railroad. The class of European immigrants that are desired in North Carolina have been accustomed to excellent roads, and it is natural that a section of country in their own country that is traversed by good roads connecting the various farming districts with markets and provide easy means of intercourse between different neighborhoods will be more attractive than those dis-

tricts in which the roads are poor and at some times of the year almost impassable.

We not only want European immigrants, we want to attract Americans from other sections of the United States to the south to invest in our farm lands, our waterpowers and to build up manufacturing industries. Good roads are of vital importance to these classes of men. There is no doubt but hundreds and even thousands of good farms in the south remain wholly or partially unenltilized and improductive on account of the very poor condition of the roads connecting them with town and market.

If the railroads consider it necessary to improve their road beds and their rolling stock in order to build up a certain section of the country and spend large sums advertising the railroad facilities of the section in their attempts to induce labor and capital to locate there, how much more important that the counties and townships should improve their public roads, making them as far as possible macadam roads and thus offer the strongest inducements for capital and labor to invest in their districts.



Sand Clay Road between Franklinton and Louisburg, N. C.

The counties that are attracting the most capital and labor are those in which the roads are in the best condition. These counties will continue to derive the most benefit from any movements that are made for bringing capital and labor into the south. Good county roads indicate a prosperous county and it will be found that the richer, more progressive and more liberal counties are those which have spent a great deal of money in building good and permanent public roads.

Every class seeking new homes and new investments will select their locations on good roads. Some will be deterred from investing on account of the poor roads in the sections where they had expected to settle. Many do not want to settle in our cities, towns or even villages, but want to be out on farms five or ten miles from the city or town, but want to be connected with the city by good roads. If good roads are so important to those coming into the south, whether they be capitalists, health, pleasure or homeseekers, or laborers, how much more important should good roads be to those already settled here.

Consider the counties that already have developed a system of good roads and you will notice that they have by far the largest population per mile of road; that they are the richest counties, the most progressive and the most attractive to the capitalist, home-seeker and the progressive man. It will also be observed that these same counties have the best school facilities for their children.

9. Another and very important effect of improved roads on a rural community is that they will make

possible at all times of the year social intercourse between neighbors and between country and town. It will be possible for neighbors to visit each other at any time without driving or walking through the mud. To my mind this will be one of the strongest factors toward keeping the young people on the farm, and we will not have so many of our boys and girls rushing to towns and cities to accept positions, at small wages, in stores and mills, preferring more or less hardship in town than the isolation of the farm. Notice, for instance, how many of our city people are buying up property in the country where these are connected by improved roads with the city, preferring the country life, provided they can easily and quickly reach the city.

At the present time it is possible for any country place to have all the modern conveniences that can be found in any city home and at no more expense than these same comforts cost in the city, yet, if the country home is supplied with all these but is separated from five to ten miles from the city by bad roads these other modern improvements count for but little. It is the isolation that the young people are objecting to and not the work or the life on the farm itself.

How to Obtain Good Roads.

The old method of obtaining revenue for the construction of roads was by levying a labor tax, which required all able-bodied, male residents of a state, between certain ages, to work on the public highways within their respective townships for a certain number of days per annum; but in lieu of this labor they could pay a certain amount for each day that they were required to work. While thousands of miles of public roads have been built by this means, there are but few miles of graded or improved roads constructed, and it is practically impossible to construct a system of good roads in this way. If this does not give good improved roads how can they be obtained?

Public roads are public necessities and the benefits to be derived from their construction in the various counties composing the state is not only of great value to each county but also to the state. Public roads are ready to serve all classes, they are the common property of all the people and all the people have the right and privilege to use them, therefore, why should not all the people bear some of the expense?

To carry out this work to the quickest and to the best advantage the county should issue bonds in order to secure the necessary funds.

Many of the counties throughout the south have already issued bonds for the construction of macadam or other forms of improved roads. The result has been that these counties have been more thoroughly developed and become much more prosperous than those which have been contented with poor roads. The issuing of bonds by a county will mean but a very small increase in taxes, which as the years go on, will be more than counterbalanced by a large increase in the value of lands and of other taxable property. It is a fair and equitable arrangement that future generations should pay for a portion of the improvements of our public roads, as they derive as great a benefit as the present generation. Too many have an idea that to bond their county will mean a very large increase in their taxes, without their deriving any material benefits from their expenditures, not realizing that the increase in the value of property, and the decrease in the cost of the maintenance of the roads, and the wear and tear on horses, wagons and harness, is so much money saved.

The issuing of bonds makes available funds in suffi-

cient quantity to render possible the accomplishment of definite and desirable results.

They give us almost immediately the benefit of good roads, while the payment for them is deferred for many years, until the county has progressed in material wealth to enable it to pay the bonds without unnecessary inconvenience.

They obviate the necessity for a high road tax while accomplishing the results for which such a tax would be levied.

They give us good roads now, and make the best sort of argument for the extension of this progressive movement.

It is a significant fact and one worthy of consideration, that not a single county that has begun the construction of macadam or other improved roads, has been willing to call a halt in their construction.

Let us consider briefly what a \$100,000 bond issue would cost a county: In the first place, I believe the bonds could be sold as bearing 4½ per cent interest. This will mean that the interest on the issue of \$100,000 will be \$4,500 per annum. It will also be necessary to put by a sinking fund to take care of these bonds on maturity, such a sum as is necessary can be put by each year at 5 per cent interest and at the end of 40 years will cover the bond issue. The amount that it will be necessary to put aside each year for this purpose will be \$933, this makes a total of \$5,433.00 that a county will have to raise each year to take care of this bond issue. This amount will not be as much as it would be necessary to raise by a high tax, 35-cents to 50-cents, which some counties have levied in providing the money for road construction. Suppose the assessed property valuation is \$8,000,000, a tax of only 20-cents on the \$100.00 would yield \$16,000 annually, which would be sufficient to pay the interest on the bonds, create a sinking fund, and leave enough money, \$10,500.00 for the maintenance of the improved road and to keep in repair the roads in the county that are not being permanently improved.

Right here let me strongly emphasize the necessity in good road construction that provision should always be made for keeping the roads in repair after they have been constructed, and this point cannot be emphasized too often.

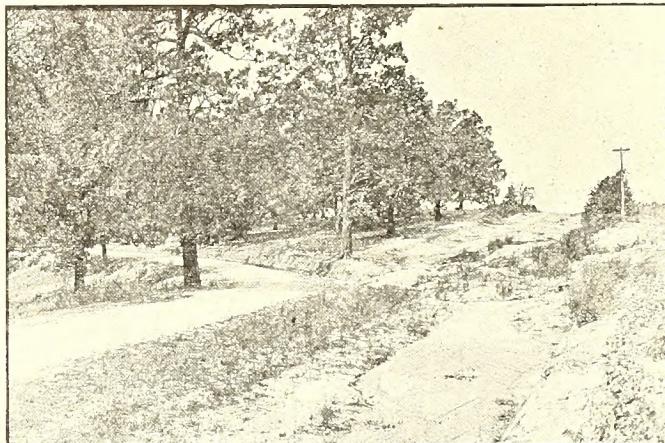
This 20-cent tax is a small tax for good roads work and, if this tax was levied without bond issue, it would usually all be spent in maintenance of the roads without permanently improving any of them.

If a county or a township decides to try and raise the necessary revenue for good roads construction by a direct tax on the \$100. worth of property, it would require an exceedingly high tax to accomplish the desired result, unless there was situated in the county a large city whose accumulated wealth could be taxed for good road work in the county. Counties situated in this way could probably raise a revenue sufficient to construct improved roads throughout the county with a tax not running over 50-cent on the \$100 worth of property. The counties, however, without large cities or towns should issue bonds for good roads construction.

Whichever way the county decides it will raise this revenue for good roads purposes, either by bond issue or high tax, it should supplement this by a poll tax of \$1.00 or more. It seems to me that it is fair and just that every man should pay a tax for good road construction even if he does not own any property, for the reason that he is directly benefitted by the construction of good roads in the county in which he lives, in the uplifted tone of the community, in the general increase in values which has never failed to follow in

the wake of public road improvement, in the increase of trade, and in the increase in the demand for labor in both town and country. This, of course, will mean that some will pay both poll and property tax for good roads work, but these could well afford to do so on account of the increased value of their property.

Still another supplementary source of revenue for good roads construction may be had by a state and county by taxing all vehicles that use the public road. We have started this movement by placing a special tax on all vehicles using the public road, because all injure the road and increase the cost of its maintenance. A great deal of stress has been laid on the great destruction to a road by the automobile. While this is true, it is not the automobile alone that causes the damage; it is a combination of iron tired wagons and the automobile. The automobiles alone, run at a moderate speed, would cause but little damage to our public roads; but the cutting and grinding influence of the iron tires and the suction of the tires of the automobile are what cause the great damage when these two classes of vehicles use the same road. As all vehicles



Sand Clay Road, Franklinton Township, Franklin County, N. C., showing relocation, old road to the right over the hill

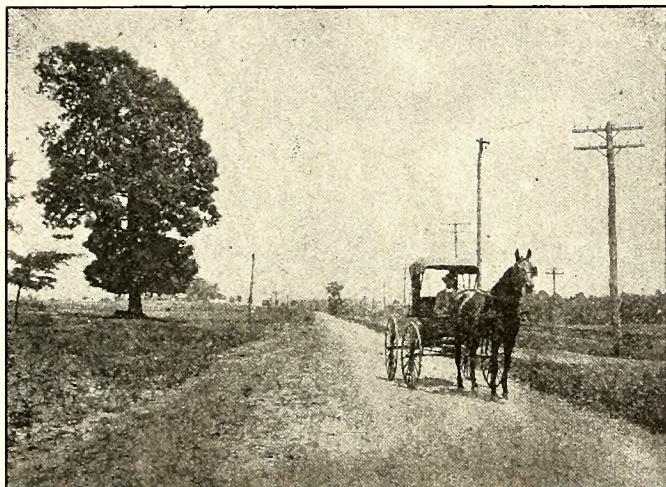
are partly responsible for the damage to our public roads, I believe all vehicles using them should be taxed for their maintenance. For vehicles there should be a sliding scale, graduated not only according to the load a wagon will carry but also graduated according to the kind of tire that the vehicle has, thus, a buggy with rubber tires would be taxed the lowest, while a wagon capable of hauling two or more tons, with a very narrow tire wheel, will be taxed the highest. Automobiles should be taxed according to their horse power; as, for instance, \$10 a year for a twenty horse power machine, and 50 cent per year for each additional horse power. Of the revenue raised in this way, on automobiles and other vehicles, one half of the amount should go to the county in which the owner of the vehicle resides to be used in the maintenance of that county's roads, and the balance to go into the state's road fund for general road work; this tax to be in lieu of any other tax on automobiles or other vehicles that use the public roads. I believe after such a tax had been in force for a short while and our citizens realized that the money thus raised was used for maintaining the public road that there would be no complaint whatever against such a tax.

A bond issue supplemented by a poll tax and vehicle tax should give any township or county in the south sufficient funds with which to construct a system of good roads, without working a hardship on any one and at a low rate of taxation.

After provision has been made for raising the revenue for the construction of improved roads, the next question is its expenditure, which if not done wisely and to the best advantage, is apt to be the death blow to good road work in that community. There are several questions to be considered, as, location, grade, and surfacing material, regarding which it is necessary to have the advice of experienced road engineers. The money spent in obtaining this advice should be the best investment of any part of the road fund.

While some counties are more advantageously situated than others in relation to materials suitable for use in the construction of good roads; are more thickly populated; and have a greater value of taxable property per mile of road; yet in every town and county of the south a considerable advance can be made in the construction of improved roads. Each county has certain difficulties to overcome in relation to good roads problems and these conditions as they exist should be faced fairly.

The question of the distribution of materials which are suitable for road construction is a matter that needs investigation in each state. A large part of the



Macadam Road, Mecklenburg County, N. C.

south appears on cursory inspection, such as is ordinarily given, to be essentially destitute of materials which can be used in building roads, yet, when an engineer investigates this same region there are often located deposits of gravel and rock that are suitable for road material. Suitable clays and sands readily reveal themselves to his trained eye, and, in the end, it is found that a good, surfaced road can be constructed, within the means of the inhabitants, where they had always thought it was impossible.

I believe that to advocate, indiscriminately, macadam or tar-macadam roads as the only improved roads for the south, would discourage and effectually set back the cause of good roads in many sections. We must intelligently decide which road is best for each community. There is, however, an opportunity for the improvement of the public roads in every county in the south; and, where some will make macadam, some sand-clay, and others gravel, there will be some counties that may, for some time to come, only be able to make the dirt road. It will be found, however, that it is to the advantage of the county to construct their main roads or arteries of travel of tar or asphalt—macadam, sand-clay, or gravel, and then improve their dirt roads leading off from these main roads by re-locating and grading these roads so as to reduce the grades, so that they are not over $\frac{1}{4}$ per cent; crown-

ing them, so that all the water will readily run off their surface; and ditching them, so that the water can be carried quickly away from the road beds to keep them from softening. In this way the dirt road can be kept in good condition practically the whole year, except during times of freezes and thaws.

No one unfamiliar with the principles of engineering and road construction can carry on the work satisfactorily and economically. And it is to the benefit of the community that a competent engineer be employed, either permanently or temporarily, to plan out and supervise the location of the road and its construction. Lack of an engineer may mean the unwise expenditure of the money raised for good road work.

When we stop to consider that in all the southern states that less than 10 per cent of the public roads are improved roads, it will at once be realized that the mileage of the dirt road will be in excess of the hard surfaced road for many years to come. We must therefore in all our road work give careful thought to the improvement of the dirt road. Although a dirt road cannot be kept in good condition during that part of the year when there are freezes and thaws, yet if constructed right and the split log drag is judiciously used, it can be kept in good condition the balance of the year. The dirt road must be graded (no grade should be over $4\frac{1}{2}$ —5 per cent,) thoroughly drained and kept a dirt road, that is all roots, stumps and rocks should be removed from the surface of the road so that the split log drag can be used effectively. When repairing the dirt road, all holes should be filled as nearly as possible with dirt of the same character as the material already in the road, so that the wear on the road surface will be uniform. With good grades, thorough drainage and right use of the split log drag the dirt road will become a very acceptable road.

Maintenance Funds.

No matter what character of road has been constructed, whether with a hard or dirt surface it will constantly need repairing and funds should always be provided by every county for the maintenance of its roads.

Roads will not maintain themselves, and no matter how carefully they may have been constructed they must be constantly watched. Every weak place that develops in them should be prepared at once and funds should always be available for this purpose. Maintenance funds should never be used for constructing roads. It is a very expensive policy to build a good road and fail to make provision for its maintenance, it is as bad as buying expensive machinery and making no provision for oiling it or keeping it clean.

Amiesite.

Attention is called to the advertisement of the "Amies Road Company," on the back cover of this issue.

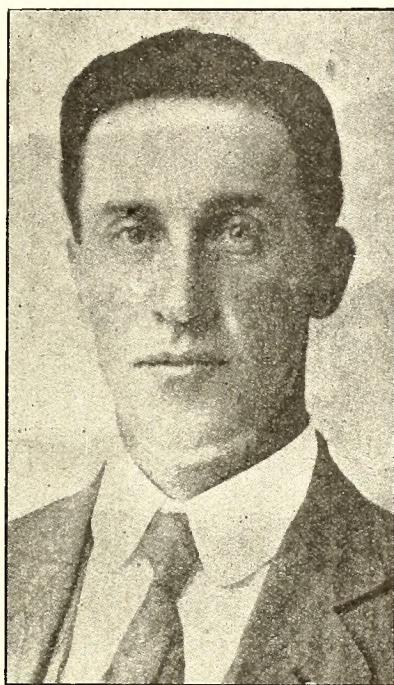
Amiesite is rapidly gaining favor with the road building public. Their many large plants are reported to be in full operation and new plants are being established to meet the demands for their material.

As hereofore stated, the Editor of Southern Good Roads, has personally investigated the merits of Amiesite and is convinced that this wonderful road building material producing such perfect bituminous roads of the highest type at such a moderate cost, needs only an introduction to establish it in any locality interested in securing permanent roads and streets, with full returns for the money invested.

Guess work and experimenting is eliminated by the use of "Amiesite."

Good Roads Train for the South

The Southern Railway Company was one of the first railway companies of the United States to recognize the necessity of good roads and the immense value of good roads to railroads. Several years ago it operated a good roads train, arousing much interest all over its lines and now it proposes to do the same thing over again, this time on a larger scale than before. The good roads train will be much better equipped this time and practically the entire Southern system will be traversed.



MR. D. H. WINSLOW
U. S. Superintendent of Road Construction, Washington, D. C.

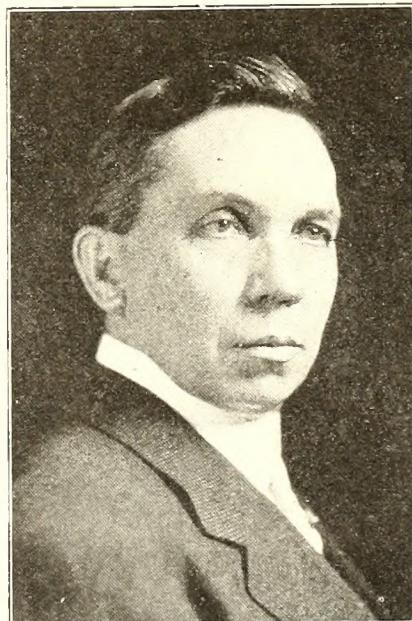
The train is to be known as the "road improvement train" and is to consist of three coaches, one provided with lantern slides, stereoptican and screen, another with exhibits and working models and the third reserved for the men who will travel with the train. The train will stop at every big town in the south and at nearly all of the smaller ones, and speeches will be made by the leading road experts of the nation. The great tour is to be made under the direct supervision of the United States Office of Public Roads, in connection with the American Association for Highway Improvement. Mr. W. W. Finley, president of the Southern, is a member of the executive committee of the American Association for Highway Improvement and Hon. Logan Waller Page, director of the Office of Public Roads, is president of the association; so it may be seen that the relation existing between the three factors entering into this good roads enterprise are close and intimate and the tour will be no cheap advertising scheme, promoted and designed for the purpose of boosting the Southern. The Southern will, of course, get a great deal of valuable publicity out of the undertaking, but its primary object is to help along the movement for good roads in all parts of the south. The Southern has come to the realization of the vast economic importance of the good roads movement and is

ready and willing to spend many thousands of dollars to further it.

The equipment of the cars and other details of the big tour were outlined by the Atlanta Journal recently as follows:

In the coach provided with stereoptican equipment, will be views showing all the advantages of good roads and disadvantages of bad ones. There will be shown, for instance, the manner in which doctors are caught in the ruts of bad roads while on their way to patients; undertakers' wagons delayed on the way to the cemeteries; automobilists thrown on the road by a boulder in a bad road; and two loads of cotton, one from a bad road territory, and the other from a good road territory, the difference in weight showing the profits and losses that come from good and bad roads.

In the second car, there will be large photographs showing some of the finest roads in the world, including the well-nigh perfect roads of France. These photographs will illustrate nearly every phase of the good roads movement. For the farmers and experts, there will be working models in this car, showing materials that make the best roads; the way a soggy clay road can be improved by the mixing of sand; the way macadam and other hard roads are built; and practical suggestions which will be of benefit in the case of each individual. If the farmer has been at a loss how to improve his road, he can find out all about it by attending



MR. W. D. BROWN, Washington, D. C.
Editor R. F. D. News and Organizer American Association for
Highway Improvement

the train exhibit. Arrangements may even be made so that the persons in each town along the route to be traversed may send in specific questions before the train arrives, they being answered in the lectures that will be given. The aim of the Southern Railway company and the government is to aid each individual case as much as to stimulate general interest in the good roads movement.

There will be two lecturers from the office of public roads on the road improvement train, Mr. D. H.

Winslow and Mr. H. C. Wells, and the Southern Railway Company will carry its land and industrial representative along. These men will be prepared to lecture, explain and give aid to the thousands of persons who are expected to attend the lectures in each town. The agricultural official of each state will also be asked to accompany the train while it is in his territory. Other officials will be notified from time to time, and the county supervisors will probably find the exhibit decidedly instructive. All the associations whose aim it is to build, improve and maintain highways will be invited to take part in the meetings.

The Southern has sent out posters announcing the schedule for the first twenty-four days of the tour, giving full particulars and telling just when the train will start. The campaign opens up at Mobile, Ala., at 10 o'clock in the morning May 1, and the following towns are scheduled for one day each in the order named: Mobile, Mt. Vernon, Whatley, Thomasville, Pine Hill, Gastonburg, Marion Junction, Greensboro, Marion, Uniontown, Demopolis, Selma, Maplesville, towns on the Mobile & Ohio Railroad from May 10 to May 13th, Columbian, Childersburg, Talladega, Anniston, Heflin, Pell City, Russelville, Haleyville, Jasper and Birming-

ham. The train will reach Birmingham for the opening of the National Good Roads Congress and will remain there during the meeting, giving a continuous exhibition of improved road machinery, road building material, working models, run by electricity, and other interesting features.

The itinerary of the train after leaving Birmingham will be announced later. It will end with the great national good roads meeting in Richmond, Va., next October.

The object of this train, as stated by Mr. M. V. Richards, the land and industrial agent of the Southern, is "to give practical instruction in the building and maintenance of improved roads, with the view of inducing their construction and saving millions of dollars annually to the farmers in the movement of crops to the railway."

Road organizations desiring detailed information as to the train and its movements should address Dr. Logan Waller Page, director of the Office of Public Roads, U. S. Department of Agriculture, Washington, D. C., or Mr. M. V. Richards, land and industrial agent of the Southern Railway Company, Washington, D. C.

The National Good Roads Association

The Fourth National Good Roads Congress will meet in Birmingham, Ala., May 23 to 26 inclusive. Five thousand delegates from all parts of the United States are expected. Every state, every important city and

almost every county in the nation will be represented. The numerous good roads organizations in all parts of the country and hundreds of agricultural, automobile, educational, industrial and transportation organizations will also have representation and the meeting promises to be of great benefit to the good roads cause. The railroads will give reduced rates and Birmingham assures the country that there will be hotel facilities sufficient unto the needs of all who attend.

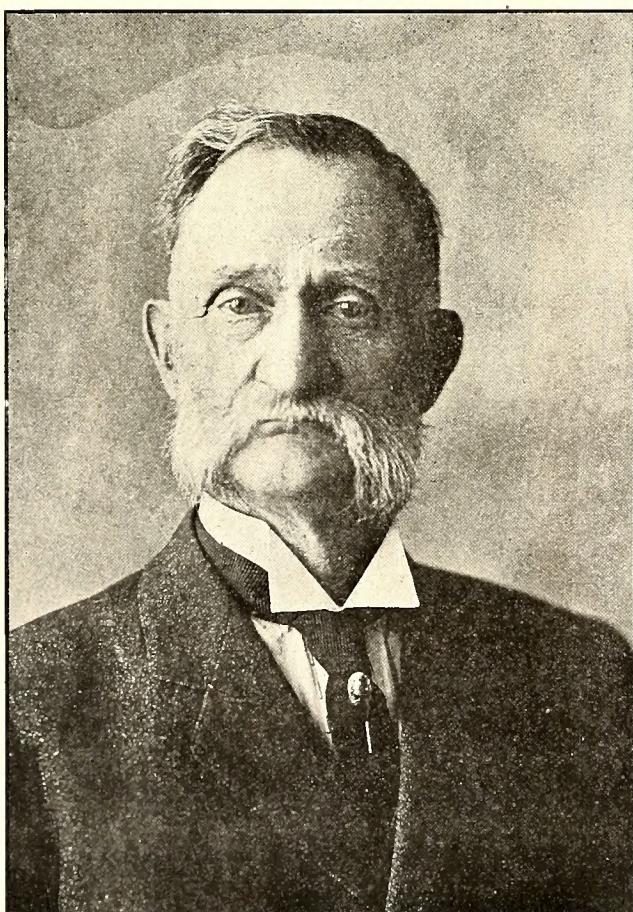
The people of Birmingham are preparing to entertain the visitors in a fashion nothing short of royal. Her hospitality is nation-wide in its scope and she has invited the fifty-two governors in the United States, asking each to appoint 100 delegates; the mayors of a thousand cities, each to appoint 20 representatives; a thousand chambers of commerce, each to send 20 delegates, and the indications are that there will be thousands in attendance.

Governor Emmet O'Neal, the Irish chief executive of Alabama, has issued a proclamation which reads as follows:

"Whereas, the National Good Roads Association has accepted the invitation of the Alabama Good Roads Association, the Jefferson County Good Roads Association and Board of Revenue, the City of Birmingham and its Chamber of Commerce, Board of Trade, Business Men's League and Motor Club, and issued an official call for the Fourth National Good Roads Congress to be held at Birmingham, Ala., May 23, 24, and 26, 1911;

"And, whereas, no more important matter can engage the earnest attention of our state and nation.

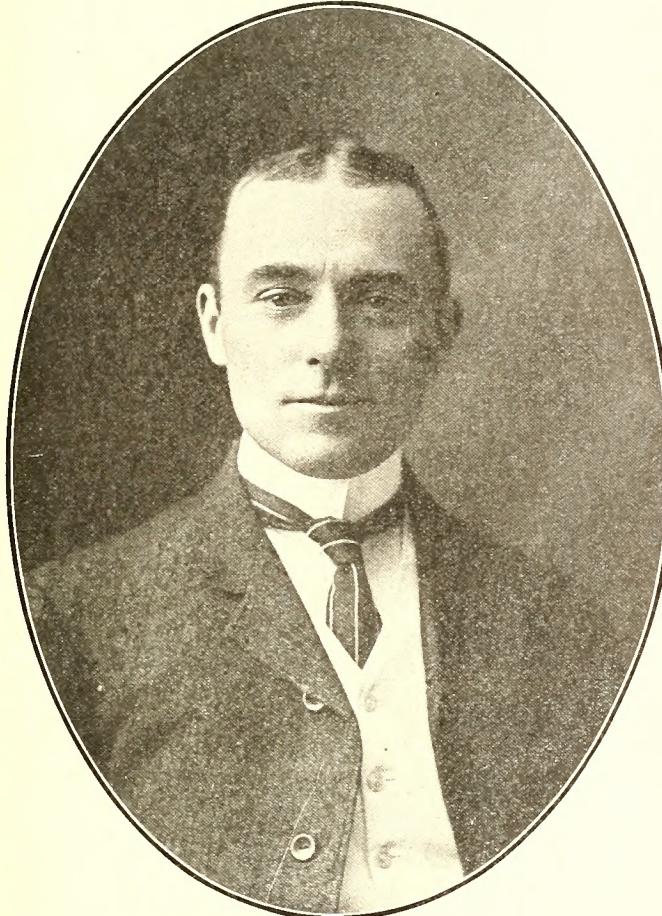
"Now, therefore, I, Emmet O'Neal, governor of the state of Alabama, hereby issue this proclamation and urge the public officials of all states and cities to be present in person and by delegates at the said Fourth National Good Roads Congress, and I hereby appoint and commission each probate judge, county commissioner, member of board of revenue, and road supervisor in the state of Alabama as a duly accredited delegate, to represent the subdivision of the state in which said person resides, at this congress, and urge each of



MR. W. J. HULBERT
Agent Land and Industrial Department Southern Railway Company
Washington, D. C.

them to be present and take part in the proceedings of said congress.

"In testimony whereof I have hereunto set my hand and caused the great seal of the state to be affixed at



HON. CHAS. P. LIGHT

Assistant Organizer American Association for Highway Improvement,
Washington, D. C.

Montgomery, this the tenth day of April, in the year of our Lord 1911.

"EMMET O'NEAL,

Governor."

"By the Governor:

"CYRUS B. BROWN,
Secretary of State."

Mr. Arthur C. Jackson is president of the National Good Roads Association and Mr. J. A. Rountree secretary. From his headquarters in Chicago President meeting and Secretary Rountree, who lives in Birmingham, Jackson has been directing the work of organizing and arousing interest in the various states in the coming ham, has been at work for months getting things in shape for it.

A Glance at the Program.

A partial list of the speakers for this great meeting has been sent out. Others have been invited to take part in the discussions and will doubtless be on hand to add to the interest of the occasion. The following have accepted invitations to deliver addresses and will be heard at the meeting:

Governors.

Hon. Emmet O'Neal, Governor of Alabama.
Hon. Augustus E. Willson, Governor of Kentucky.
Hon. Jared Y. Sanders, Governor of Louisiana.
Hon. Edmond F. Noel, Governor of Mississippi.
Hon. Herbert S. Hadley, Governor of Missouri.

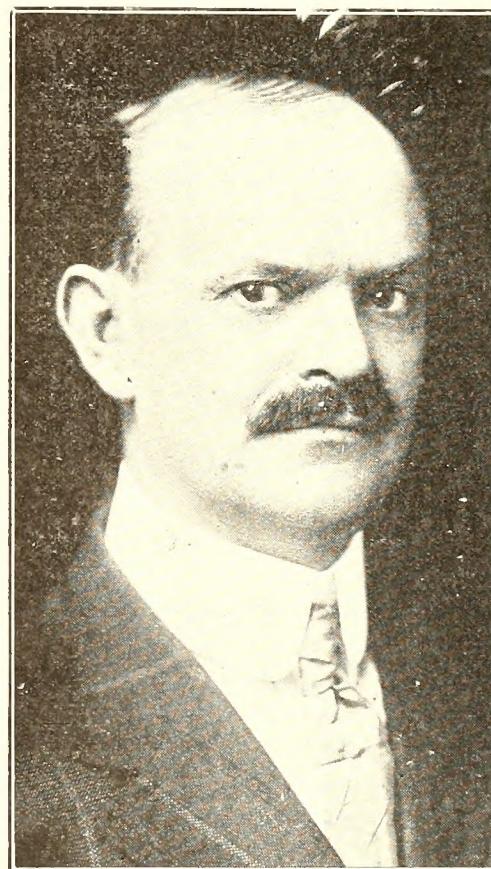
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Hon. Wm. Richardson, Eighth Congressional District of Alabama.
Hon. Oscar Underwood, Ninth Congressional District of Alabama.



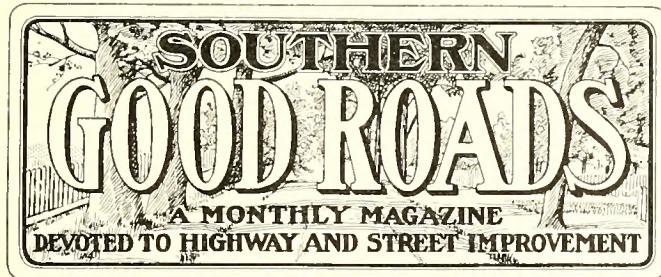
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No. 5.

THE CENTRAL HIGHWAY.

An ambitious undertaking is that faced by the North Carolina Central Highway Association. In this issue of Southern Good Roads Mr. Edward E. Britton tells of the completion of the organization in Raleigh last month and of the enthusiasm of the men who are leading the movement.

Iowa built a dirt road across the entire state in one day—a distance of 380 miles. The North Carolina highway will be 460 miles long. It will take more than a day to build it and when built it will be one of the finest roads in the south. The last legislature authorized the boards of county commissioners to appropriate \$50 per mile per year for the maintenance of the road and it is believed that many of the counties will vote special taxes and bonds for the road. One county sent word to the central committee when it met in Raleigh last month that its citizens stood ready to vote a tax of fifty cents on the \$100, rather than lose the road. All along the line there is a spirit of rivalry and healthy competition. There will be scores of neighborhood contests over the route for the highway and several counties are contesting for the line. This will mean even greater interest in the road.

After the route has been laid off by the scout cars which start from Morehead City May 8th, the work of arousing the people along the line will begin and a day will be set for general road work, calling out every man who lives within five miles of the road on either side, with wagons, teams, road drags, etc., for a day's work on the roads. The road will traverse nineteen counties and it is believed that there will be 50,000

men and 10,000 teams on the road for the day—perhaps many more, for the counties to be traversed are populous, full of progressive citizens, and good roads enthusiasts.

The central highway, if completed according to the plans of the promoters, will be of incalculable value to the state. It will become the favorite of the autoists, a means of spreading the wealth of the tourists from the mountains to the sea. From the coast to the western North Carolina line the road would afford a wonderful variety of scenery and an equally wonderful variation of climate. The tourist would pass from the delightful sea shore, through the fertile trucking fields of eastern Carolina and the cotton belt of the central part of the state, into the Piedmont section with its varied agricultural and industrial activities and on into the great mountains of the west, the "Land of the Sky," experiencing every variety of climate possible between sea level and the lofty summit of the Blue Ridge mountains, three thousand to six thousand feet above the sea.

In the nineteen counties through which the road will pass it is intended to make the Central Highway the model road of the county. It will pass through all of the county seats and will form a trunk line through each county that will call for feeders just as good in every county. The building of the road will eventually mean the building of a perfect net work of good roads in every county and this sort of missionary work is badly needed in many of the counties through which the highway will pass. Some of the counties have never made a beginning at road improvement, while others are far advanced. The Central Highway will help them all.

Over the mountains in Tennessee Governor Hooper is striving to build a great highway from Bristol in the north eastern corner of the state to Memphis in the southwestern corner. It is to be hoped that some plan may be devised to bring these two great highways together. With the North Carolina Central Highway connected with the Tennessee Central Highway, there would be a great trunk line from the Atlantic to the Mississippi river. The men behind the two projects should work to this end and we hope that they will.

A WOMAN FOR GOOD ROADS.

The women's clubs of the nation waste worlds of energy on thousands of pet projects. There are schemes to better the condition of the poor of the factory districts of our great cities and the rabble of the tenement districts of such cities as New York and Chicago. Many thousands of club women in the north have wept real tears over the sad state of morals, finances and learning in which the "poor mountain whites" of the Southern states find themselves and money is spent to send missionaries to them. All of their tears and all of their money is a dead waste. Their work and expenditure in the tenement and factory districts is generally ineffective and when they come to dealing with the so-called "poor mountain whites," they meet with

resentment rather than appreciation. The mountaineers of the south need no sympathy. With the exception of their almost complete isolation by reason of the very worst of roads, their lot, as compared with that of city dwellers and the denizens of the plains and swamps, is to be envied and all of the good hard cash spent in missionary work among people that live closer to God than the missionaries themselves is wasted.

Out in old St. Louis there lives a club woman who has made a center shot with what is a brand new proposition in club circles. Her name is Mrs. Fred DeGarmo, and her pet hobby is good roads. She began to make herself heard several months ago. She is a high official of the Mothers' Congress of Missouri and stands high in the counsels of the National Mothers' Congress, and she is preaching the doctrine that all that the people of the rural districts and of the mountain regions need is good roads. She would have good roads connecting the home and the schools in the country, good roads between the farm home and the church and Sunday school, good roads in order to secure good teachers for the country schools and good roads for the young people to travel over to their places of amusement. She believes that good roads in the country will solve nearly all of the problems that reformers, misguided club women and unappreciated missionaries labor over.

A part of this good woman's plan is to have lecturers

to work through all of the country districts, especially among the women, all backed by a strong press bureau. She would have taught in every public school in the land, both city and country schools, a system of road-building which could be understood readily by the child. So persistently has this enthusiast pushed her plans in Missouri it is highly probable that she is soon to see some of them tried out in her own state.

Mrs. DeGarmo is the woman who originated the boy cadet patrol in Missouri, an organization with "patrols" in many counties of the state keeping close watch on the roads of their sections, reporting all holes and other deficiencies. The organization is patterned after the regular army of the United States and it has spread to other states, notably to Louisiana, where it won instant favor with the boys. She is putting up a fight to have the patrol system given legislative sanction and she will win.

Mrs. DeGarmo points the way to a field of wonderful usefulness for all women's clubs. It has been our observation that when a woman's club once becomes convinced of the merit of any proposition something happens. They make mistakes, but their mistakes are usually "mistakes of the head and not of the heart." If Mrs. DeGarmo succeeds in enlisting them under the good roads banner wonderful things will be accomplished.

The North Carolina Central Highway

By EDWARD E. BRITTON, City Editor of the News and Observer

The greatest movement ever started in the United States for a continuous good road across a state has started in North Carolina. It is for a Public Central Highway of 460 miles across the state, from Beaufort Harbor on the coast, to the Tennessee line in the mountainous west. The trustees appointed by the recent General Assembly to have general charge of the designating and the constructing of the Central Highway, met in Raleigh Thursday, April 20, organized, and made plans to push the campaign for the making of the great stretch of road. The meeting, with men in it from the mountains to the sea, was bubbling over with enthusiasm and earnestness.

The undertaking is an ambitious one, and it means constant effort on the part of the nineteen trustees, one for each county through which the highway would pass, but the men named for these responsible positions are determined that the plan shall be carried to success. The work they have undertaken is a patriotic work, with no compensation attached, the members of the board even paying their own expenses, unless County Boards of Commissioners may decide to pay these. But the men who came to Raleigh yesterday did not halt at this, and for the betterment of the state, met their expenses out of their own pockets.

The two most important steps taken were the election of officers and the setting of dates for visits to the counties through which the highway will pass. The officers elected were:

H. B. Varner, of Lexington, editor of Southern Good Roads, chairman.

Edward E. Britton, of Raleigh, secretary.

George C. Royall, of Goldsboro, treasurer.

Central Committee—William Dunn, of New Bern; Dr. J. M. Templeton, of Cary; R. R. Clark, of Statesville; W. T. Morgan, of Marion; Thomas J. Murray, of Marshall; J. A. Wellons, Smithfield, secretary; H. B. Varner, of Lexington, chairman ex officio.

First Tour in Campaign.

The initial tour of the Central Committee, with other members of the Board of Trustees, and a representative of the Highway Division of the North Carolina Geological and Economic Survey, will be made in automobiles, and at each stopping point on the route, there will be a "Good Roads Day" meeting, at which routes will be discussed and plans made for the construction of the Central Highway. The dates for these meetings, each to be held at one o'clock in the afternoon, are:

Morehead City, May 8.

New Bern, May 9.

Kinston, May 10.

Goldsboro, May 11.

Smithfield, May 12.

Raleigh, May 13.

These will be the points for the first week of the tour, and the next tour will be from Western North Carolina, back to the central portion of North Carolina. The second tour will begin the first week in June, in Madison county, and will be continued through thirteen counties till Durham is reached.

The Interest in the Meeting.

The interest in the meeting and the enthusiasm in the cause of good roads was shown at the organization

meeting of the Board of Trustees, held in Raleigh, Thursday, April 20. Of the 19 members, thirteen were present in person, two by proxy, and a telegram came from one, this leaving but three counties not represented of the nineteen. That was a goodly attendee, and it shows that North Carolina is in the race for good roads. The work before the Board of Trustees was the planning for the construction of the longest public highway in the United States, the building of which will be the greatest impetus yet given to good roads construction in North Carolina.

In attendance on the meeting of the Board of Trustees, the representatives of the various counties were:

Carteret—G. D. Canfield, of Morehead City.

Craven—William Dunn, of New Bern.

Lenoir—J. F. Hooker, of Kinston.

Wayne—George C. Royall, of Goldsboro.

Johnston—James A. Wellons, of Smithfield.

Wake—Dr. J. M. Templeton, of Cary.

Durham—Dr. A. Cheatham, of Durham.

Orange—H. M. McIver, of Mebane, No. 4.

Alamance—Capt. S. H. Webb, of Mebane, No. 4.

Guilford—Clem. G. Wright, of Greensboro.

Davidson—H. B. Varner, of Lexington.

Rowan—P. B. Beard, of Salisbury.

Iredell—W. L. Gilbert, proxy for R. R. Clark, of Statesville.

Catawba—John Robinson, proxy for R. L. Shiford, of Newton.

Madison—Thomas J. Murray, of Marshall.

The absentees were:

Jones—J. H. Bell, of Pollocksville.

Burke—W. E. Walton, of Morganton.

McDowell—W. T. Morgan, of Marion, who telegraphed hearty co-operation, but was detained on business.

Buncombe—E. C. Chambers, of Asheville.

Getting Down to Business.

The meeting of the Board of Trustees was called to order in the office of the department of agriculture shortly after 10:30, by Major W. A. Graham, commissioner of agriculture, designated in the act to do this. In opening the meeting, he spoke of the value of good roads to all the interests of the state, and especially of the value to the farmers. He expressed his pleasure at the large attendance, and said it recalled old times in road work, that he was glad to see the south taking such progressive steps. He declared that with good roads North Carolina would go forward as a corn raising state, and in the raising of cattle; that a native American population would be brought in; that the cordiality of our people had already brought many, as he knew from meeting men at the National Farmers' Congress held in Raleigh.

On motion of Mr. George C. Royall, of Goldsboro, the meeting elected Mr. Edward E. Britton, of Raleigh, as temporary secretary, and the roll call was made.

The Election of Officers..

For permanent chairman, Mr. Clem. G. Wright, of Greensboro, nominated Mr. George C. Royall, but Mr. Royall declined, saying the man for the position was Mr. H. B. Varner, of Lexington, who was deeply interested in good roads. At his request, Mr. Wright withdrew his name, and Mr. Varner was elected chairman of the Board of Trustees by acclamation.

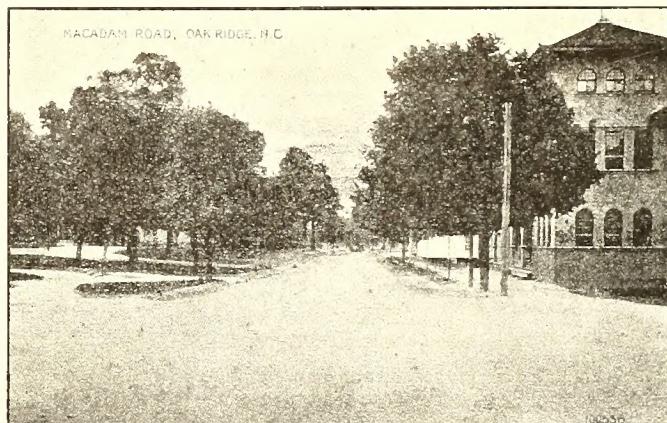
In accepting the position, Mr. Varner said that he appreciated the honor, but that he realized the responsibility; that it meant work and expense. He said he could give the work, but that the expense was the question. However, he declared he would give full

co-operation and do the best he could. The undertaking he declared to be the greatest yet attempted by any state in the union, this the building of a highway 460 miles long, dealing with all kinds of soil. To build it meant co-operation and organization. The thing to do was to go over the road, arouse the people, and carry the work to completion.

Mr. George C. Royall nominated as permanent secretary, Mr. Edward E. Britton, of Raleigh, and his election was unanimous, being seconded by Mr. Clem. G. Wright.

Both Mr. Clem. G. Wright and Mr. George C. Royall were nominated for treasurer. Each gentleman advocated the other, but finally on motion of Mr. Wright, the trustees elected Mr. Royall as treasurer.

Then came the election of the Central Committee. On motion of Mr. Royall, seconded by Capt. S. H. Webb, the chair named as a committee to select these, Dr. A. Cheatham, of Durham, and Mr. Clem. G. Wright, of Greensboro, the chairman being added on motion of Mr. Royall. The report, which was adopted, named Messrs. William Dunn, of New Bern; Dr. J. M. Templeton, of Cary; R. R. Clark, of Statesville; W. T. Mor-



Macadam Road, Oak Ridge, Guilford County, N. C.

gan, of Marion; Thomas J. Murray, of Marshall, and J. A. Wellons, of Smithfield, with H. B. Varner, ex officio chairman.

Discussing Good Roads.

Capt. S. H. Webb, of Alamance, said that there would be full co-operation given by Alamance. He spoke of road conditions, and said that with a few miles yet to be built, there would be good roads for the Central Highway in Wake, Durham, Orange, Alamance and Guilford.

Chairman Varner spoke of the need of definite plans, and that money must be raised. He told of various donations that might be obtained from citizens, business concerns, and railroads. He declared that there must be organization; that a blaze of enthusiasm must be created that would burn a streak from end to end of the state. He urged that there be an aggressive campaign, and told of a machine company offering the use of an automobile to go over the route.

Mr. George C. Royall next spoke concerning the advisability of dividing the Central Committee's work into sections, the chairman with two members to constitute a quorum in dealing with the roads of any section. This view met with the approval of the Board of Trustees.

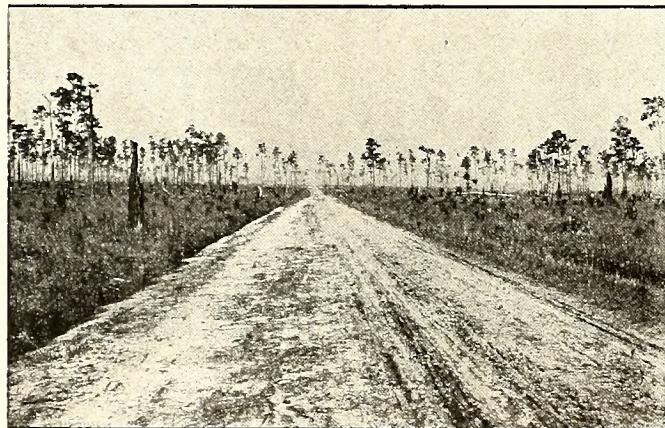
Capt. S. H. Webb expressed the view that the Central Committee should not have power to supersede the local committee in its choice of routes in any county, and this was agreed to. He said that the first thing

necessary was to lay out the route of the highway. Mr. Royall said that his view was that all road location would have to be referred back to the entire board. This was also the view of Dr. Cheatham, of Durham, and after some discussion, a resolution proposed by Mr. Royall, was adopted, that the Central Committee be empowered to do all detail work, to divide the committee into sections as it may see fit, and that it be empowered to receive all donations for the road.

Mr. Royall proposed another resolution that was adopted. This was that the Central Highway Commission request each Board of County Commissioners on the route to appropriate \$25 towards the preliminary expenses of the Commission. Many of the board declared that the commissioners of their counties would readily appropriate this amount.

Capt. S. H. Webb introduced a resolution that the Geological and Economic Survey be requested to locate the route of the Central Highway as soon as possible, in order that County Commissioners might make appropriations for it. This was adopted.

Mr. Thomas J. Murray made inquiry as to whether it was determined that the Central Highway would pass through Madison county; that there was some talk of diverting the line through Haywood. He said that in Madison county the people are enthusiastic for the



Natural Sand Clay Road, near Mobile, Alabama

highway, and that they were ready to vote 50 cents on the \$100 of property for the road; that the Board of County Commissioners had appropriated \$40 that he might attend this meeting, and learn of the purpose. He was told that Madison county had been put on the route by the legislature, and that unless a county failed to provide for the road it would be kept on the route. Mr. Murray stated that Madison county was ready to go to work just as soon as the road was located in it.

Mr. G. D. Canfield introduced a motion that the first selection of a route be made in the eastern section and after this in the western section. This motion was adopted.

Mr. J. A. Wellons, of Smithfield, in a most enthusiastic speech, said that Johnston county was ready for the road and would fully co-operate as soon as the route was selected. He declared he was ready to give time to the work in eastern North Carolina, even if his services were required for a month in locating the road. He declared the project to be the greatest yet undertaken in North Carolina, and that the people would provide the money. In high terms he commended the work of Chairman Varner, saying that his magazine, "Southern Good Roads," was the best of which he knew.

Mr. G. D. Canfield said that the people of his section would give a hearty welcome and a big clam bake to the party when it came to locate a road.

Chairman Varner said that he would endeavor to have an early start made in locating the highway.

Dr. A. Cheatham, of Durham, urged that the rule be "Go slow" in building the roads; that big enthusiasm at first did not count, but work did. What he desired was that the best of roads be built, and that this would take time and money.

Mr. John Robinson, of Catawba, said that the County Commissioners had sent him to the meeting and that Catawba county was ready to co-operate and do its part; that in proof of this it had paid his expenses to the meeting.

The matter of local county committees was next discussed, and on motion of Dr. J. M. Templeton it was agreed that these should consist of five each, to be named by the member of the board of trustees of each county. As soon as these are selected their names are to be sent to the secretary.

On motion of Dr. J. M. Templeton, a resolution was adopted requesting Boards of County Commissioners to pay the actual expenses of members of the Board of Trustees when in attendance at Central Highway meetings. This was adopted.

On motion of Capt. S. H. Webb the Board of Trustees passed a resolution of appreciation of the work of Senator J. L. Barham, of Wayne, and Representative R. D. Coleman, of Rowan, in introducing and securing the passage of the Central Highway bill by the General Assembly.

Mr. J. F. Hooker, of Lenoir spoke of the interest in his section with reference to the Central Highway and said that the Lenoir Board of County Commissioners had made an appropriation to send him to the meeting.

Chairman Varner read a telegram from Mr. W. T. Morgan, of McDowell, saying that business kept him from attending the meeting, but that McDowell county would co-operate heartily for the Central Highway.

Mr. P. B. Beard, of Rowan, said that Rowan was in favor of good roads and that it would do its full part for the Central Highway, that if other counties would do as Rowan the road would be built.

The meeting adjourned subject to the call of the chairman and immediately after it adjourned the central committee met. The committee organized with H. B. Varner as chairman and J. A. Wellons as secretary, arranged details as to the payment of expenses in conducting the preliminary campaign, and fixed the date for the opening campaign in the east as May eight, the work in the west to begin the first week in June. After this the committee adjourned.

Chairman Varner was tendered the use of a big Case touring car, made by the J. I. Case Company, of Racine, Wis., for use as the official scout car and he has announced his acceptance. The car will be at Morehead City, Monday, May 8th, in the hands of a skilled mechanician of the J. I. Case Company and ready for the long highway.

In Liberty county, Tex., Dayton precinct votes May 23rd on a bond issue of \$275,000 for good roads.

Greenville, S. C., is considering the issuance of bonds for \$125,000 for street improvement.

Liberty Precinct, Liberty county, Tex., will vote May 16th on a bond issue of \$250,000.

Warren county, Tenn., votes this month on an additional bond issue of \$100,000 to complete road work.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

All Alabama is looking forward to the meeting of the National Good Roads Association in Birmingham this month. Birmingham is situated in a county which has good roads and which is constantly improving the roads that it has. Alabama has a very valuable good roads asset in Senator Bankhead, who went into office on a ticket pledging that he would work for good roads and river and harbor improvement, with accent on the good roads. He has made good in the upper branch of the national congress and it is dead certain that he will get results before he quits. He is growing in influence and power in the United States senate and will get what he wants after a while. Alabama has something else worth exhibiting to the National Good Roads Association and that is an awakened and aroused people. Today, in spite of politicians, the people are more deeply interested in good roads than ever before and more interested in good roads than in anything else. They are thoroughly aroused on the question. Alabama is also blessed in that it has strong, aggressive and progressive newspapers and all of these newspapers are good roads enthusiasts. When Senator Bankhead ran for the senate he aroused interest in good roads in every section of the state and the newspapers have never let interest lessen for a minute. They have been right in behind the movement all the time. Birmingham, the great city which is to have the honor of entertaining the good roads enthusiasts of the nation, has two of the best newspapers in the south, the Birmingham-Age-Herald and the Birmingham Ledger and both of these boost the good roads movement consistently, constantly and persistently. A better place for the meeting could not have been selected. Speaking of the importance and scope of the meeting the Ledger said recently: It will be a great meeting of important people. All the governors of all the states have been invited. All the commissioners of all the states have been invited to consider the relation of roads to agriculture. There will be a great many great people here. Already nine governors have promised to be here for the meeting. Many commissioners of agriculture will be here. The mayors of a thousand cities have been invited and scores have accepted the invitation to come.

* * *

Florida..

The Florida legislature is to meet in the near future and much is expected of it in the way of road legislation. One of the representatives-elect, Mr. Angie, has prepared a bill providing for a ten million dollar bond issue for the state, the proceeds of the bonds to be used to build a system of state roads. The law, as drafted, provides that all convicts shall be worked on the public roads. If Mr. Angie's bill is passed the following system of roads will be built:

Beginning at the Alabama line and running to Pensacola, and from thence to Jacksonville.

Jacksonville, down the east coast, to Miami.

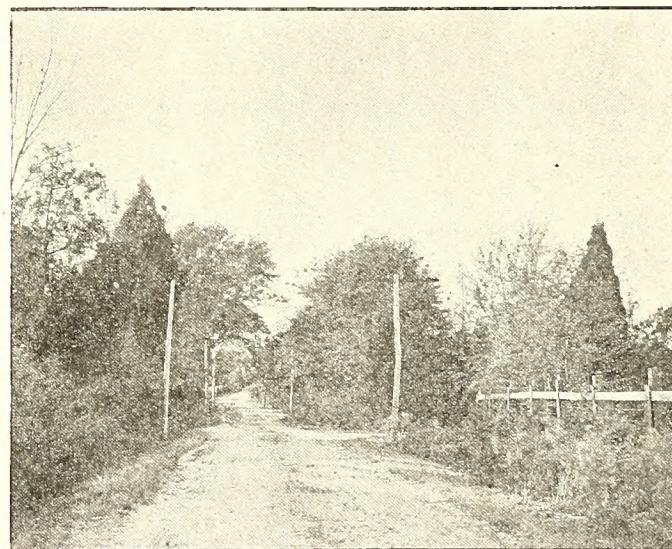
Branch from Daytona through the southern section of the state to Kissimmee, Bartow, Fort Myers, Arcadia and other points.

Branch from Bartow to Tampa, through Lakeland, Plant City and other points.

Branch from Plant City through Ocala, Gainesville and other points back to Jacksonville.

Several leading newspapers of the state have commented favorably on the bill and the Pensacola Journal voices the general opinion when it says that "with a few amendments this proposition will be acceptable to the majority of the counties and their representatives. The principal one is that calling for branch roads connecting the counties which the roads will not traverse, with the main thoroughfares."

Mr. Angie's schedule calls for the roads to run through a portion of thirty-two counties and no doubt the representatives of these counties will be in favor of his plan, but it should be remembered, cautions the Journal, that this is a state bond issue that is proposed and the other counties should be given their pro rata of the benefit. Branch roads extending from the main lines into the other counties should be called for in the bill, and if this is done the bill should be certain of support, provided it is properly drafted.



Shell Road, Near Mobile, Alabama

Ten million dollars of state bonds will hardly be felt by the taxpayers of Florida but the good from such a network of roads will be of inestimable benefit and good to the state. Having the convicts do the work will insure rapid construction, and if the bill is passed Florida will have within five years one of the best road systems in the entire country.

* * *

Georgia.

The influence of a great, conservative newspaper is truly wonderful. In the good roads movement it has been demonstrated in a thousand ways that the newspaper is the real "power behind the throne." In Georgia the Journal and the Constitution, of Atlanta, have especially distinguished themselves in the good roads movement. The Journal through its National Highway activities, has become a national force for road improvement and the Constitution has become a powerful factor at home. Recently the Constitution briefly reviewed some of its work as follows:

What promises to become an epidemic of good roads building by bond issues is in evidence in Georgia, as the result of the Constitution's several "Aronnd-the-State Good Roads Tours."

Tronp county led off with a bond issue of \$200,000 devoted exclusively to good roads.

The two latest proposals—separated by only twenty-four hours—come from Bibb and Emanuel counties.

Bibb already is numbered among the banner good-roads counties of the state, but is not satisfied.

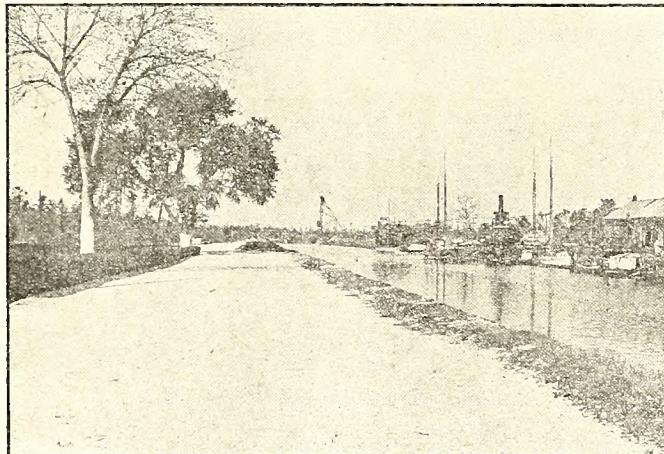
Her County Commissioners have decided to call an election for the forthcoming fall, in which the people will be asked to vote on the issuance of bonds aggregating \$525,000. Of this amount \$100,000 is to be expended upon roads and \$200,000 upon bridges.

The County Commissioners of Emanuel called a mass-meeting at Swainsboro recently to discuss the advisability of a roadway bond issue. It was the most representative meeting held in the county within recent years. By a vote of three to one it was enthusiastically decided to call the election.

* * *

Illinois.

A non-partisan good roads commission was appointed by the last legislature to investigate road conditions in the state and road-building and this commission has just made public its report. That others may avoid the mistakes that this state has made it might be well to give here a few of the findings of this commission.



Shell Road on Bank of Canal, Near New Orleans, La.

The commission gives facts and figures to show that more than \$10,000,000 is wasted annually by grafting township road commissioners and it condemns the township highway commissioner plan from the ground up. The commission found that more than 4500 township highway commissioners have been paying themselves salaries for almost every day of the year, none of them coming anyways near giving value received for the money. A number of commissioners were found guilty of taking commissions on road machinery and other graft was open and notorious. Condemning the wasteful system of allowing road funds to be handled and roads built by township authorities, the commission drives home a point that other states would do well to heed in the following:

"From our investigations we find that there are enough taxes levied in the state of Illinois annually that, if expended in an economical, uniform and systematic manner, under the supervision of a practical head, would be sufficient to construct a system of highways, intratownship, intracounty and intrastate, mak-

ing a complete network of roads and built of a character that would be a monument to the progressive character of the people of the state and add materially to the prosperity of every community."

* * *

Iowa.

The Iowa legislature in session last month passed a law in the interest of good roads that is considered the most meritorious good roads measure ever passed by an Iowa General Assembly. The bill abolishes the office of county surveyor and provides that the board of supervisors shall appoint a competent engineer to perform such duties at any time his services may be required. It also provides that the board may employ a competent engineer to make general specifications for road and bridge building. No salary is attached to the engineer feature and he will receive per diem compensation when employed by the board.

The bill further provides that the board of supervisors shall levy a tax of 2 mills for county road purposes, which is an increase of 1 mill over the present law. The trustees will be allowed to levy not to exceed 4 mills for this purpose.

It is the general opinion that this bill, together with the Kulp auto tax bill, which will give to the county fund an increase for road purposes, will result in an era of good road building in this state and will lay the substantial foundation necessary for the building of permanent highways which eventually will be the property of the state.

* * *

Louisiana.

In Louisiana there is danger of getting good roads into politics in a way that will hurt the cause. Governor Sanders is out for a senatorship and he is trying to "make every edge cut." The New Orleans Democrat charges that he is trying to ride into the United States senate on his record as a roadbuilder during his administration and that these good roads are expected to pull him through his political troubles. The Democrat goes on to say that Governor Sanders is claiming more than facts warrant when he claims to have built good roads at small cost.

According to the Natchitoches Enterprise, the governor's original figure for plain country roads in DeSoto parish was \$300 a mile, which he subsequently advanced to \$700; now reported at \$853.54 per mile, running even higher in the other parishes, to \$916.94 a mile in Rapides, while the partly graveled roads rose in cost to \$3,000 a mile in Ouachita and \$6,000 in East Baton Ronge.

The fine road built from Natchitoches to Campti, costing, according to the figures of Governor Sanders and his friends, \$640 per mile, has been found to cost \$976.64 per mile and the Democrat points out other instances, finishing with a plea for the citizens of Louisiana to "look at this matter from a business rather than from a political point of view. The people of Louisiana want good roads built as cheaply as possible, and would hate to see these roads thrown into politics, or endangered by being tied to uncertain political fortunes of the Sanders 'chariot wheels.'"

The contention of the Democrat and the Enterprise is given for what it is worth, and with no intention of siding against Governor Sanders or with him. He is known all over the south as a brilliant, able man and it is to be hoped that he will steer clear of the demagoguery which the Democrat hints at. The road question is too important and too big to be dragged into partisan politics and only disaster can come of allowing it.

Missouri.

Jackson county, the county in which is situated Kansas City, is setting an example that will have a good effect on other counties of the state. The county is seeking to interest every farmer in the roads that run through his farm and offers a King Road Drag to every man who will agree to drag the road regularly through his place. Thirty six drags have been made by the county and given out to the road supervisors. Eight steam rollers are kept in commission at all times and every section of road in the county is being looked after and kept in repair. Five big motor trucks have been purchased to haul oil and screenings to all parts of the county and close attention is being paid to repairing and maintenance. In fact, Jackson county is about the liveliest county in the state, in so far as road work is concerned and it is doing a great deal of good in the way of encouraging other counties to take an intelligent interest in roads.

At Lexington, Mo., LaFayette county, the first election under the new road law passed by the last legislature was held on April 10 and a bond issue of \$125,000 was voted for the building of macadam roads. The vote was an overwhelming one, standing 1091 for the bond issue to 209 against. In LaFayette county six other districts have been formed and elections will be held on the 20th of this month and it is believed that bond issues ranging from \$100,000 to \$150,000 will carry in each township.

The people of Missouri have been afraid of bond issues but just now bond issue fights are on in all parts of the state. Lexington, Mo., a special road district of 64 square miles, has the honor of being the first in the state to issue bonds for country roads. Bonds for \$120,000 were voted last year by a good, safe majority. The law was questioned and it was found necessary to have the legislature amend it and last month the people of this road district voted on the matter again and the issue carried by a larger majority than at first.

Hon. Curtis Hill, state highway commissioner, of Missouri, informs Southern Good Roads that Pettis county, Mo., is planning to issue bonds for \$350,000 for building stone roads. The election is to be held on the 16th of this month and there is every indication that it will carry. The Pettis county "rock road locating committee" has finished the work of laying off a system of rock roads that can be built with the proposed issue and is having a map made showing the entire mileage. The roads will be 141½ miles long and will cover the entire county. This committee was composed of two men from each township and the proposed system was entirely pleasing to all. All contending factions were placated and it is believed that the necessary bonds will be voted.

* * *

North Carolina.

In the Old North State the liveliest issue just now is the building of the great Central Highway, a road from the Tennessee line to the sea, running directly through the center of the state and touching 19 counties. It is to be nearly 500 miles long, and is the biggest undertaking of its kind that road building in the south has yet known. Another project is that of securing a road from Charleston, S. C., to Asheville, by way of Charlotte and there has been much done to get the Crest of the Blue Ridge Highway under construction.

There is to be a bond issue of \$500,000 for road work in Forsyth county. Roekingham is to hold an election to vote on a big bond issue for road improvement. Anson county will vote on a \$200,000 issue. Cumberland will vote on a like issue. Randolph proposes to issue \$300,000 of bonds. Pender, Montgomery, Lee, Beau-

fort and Stanly will vote on \$100,000 issues and Iredell will vote on \$400,000. In perhaps a score of other counties lesser amounts will be voted on and special road tax elections will be held in more than a hundred townships. In Davidson county alone six townships vote this month on special tax levies of 20 cents on the \$100 and 60 cents on the poll.

GOOD ROADS NOTES IN BRIEF

Hamilton county, Fla., will build 300 miles of sand-clay road at a cost of \$300 per mile.

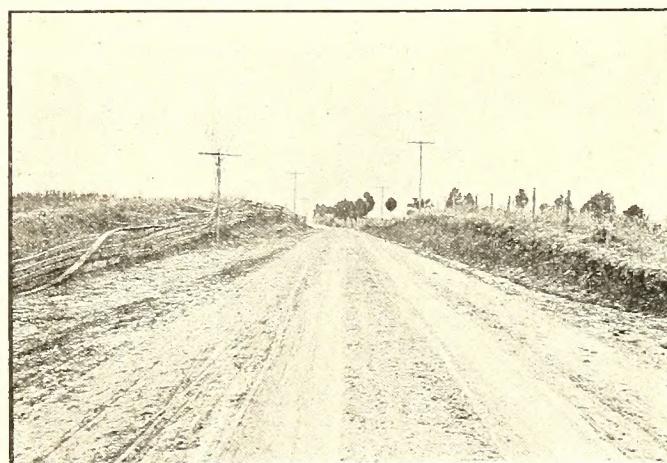
Berrien county, Ga., has awarded a contract for the building of 11 miles of road 30 feet wide.

Buncombe county, N. C., is asking for bids for a large amount of road grading.

The state road commission of Maryland is asking for bids on 57 miles of macadam road, in various counties of the state.

Chase City, Va., has awarded contract for macadamizing two streets.

The city of Easton, Md., has decided to issue bonds for street improvements amounting to \$35,000.



Macadam Road, Bristol-Blountsville, Tennessee

Justice precinct No. 2, Williamson county, Tex., has voted \$100,000 of bonds for road building.

Caldwell county road precinct has voted bonds for \$50,000 for good roads.

In Hall county, Tex., precinct No. 1, has voted \$25,000 of bonds to begin road work.

Lee county, N. C., is preparing to vote on a bond issue of \$100,000 for road improvement.

Longview, Tex., has been carrying on a campaign to make certain street improvements, among which is the paving of the business sections.

St. Petersburg, Fla., votes this week on issuing bonds for \$5,000 for street work.

West Palm Beach, Fla., is preparing to spend \$9,000 in street improvement.

Cooke county, Tenn., has placed contracts for surfacing, grading and macadamizing 25 miles of roads.

Dallas, Tex., has awarded contracts for street paving amounting to \$74,000.

Talbot and Caroline counties, Md., have decided to build a steel draw bridge and to grade and macadamize certain roads at a cost of \$29,000.

Farmville, Va., is to have paving done at a cost of \$14,300.

At Fort Worth, Tex., the city park board has placed a contract for one mile of concrete sidewalk.

Weakley county, Tenn., "gives the lie" to its name by awarding contracts for the building of good roads in 22 country districts.

Knox county, Tenn., has contracted with reliable roadbuilders for 25 miles of good roads.

Louisville, Ky., is building streets and alleys of vitrified block.

Memphis, Tenn., has contracted for \$48,000 worth of street work.

Berrien county, Ga., has contracted for a long stretch of graded road near Nashville.

Sweetwater, Tex., will pave 14 blocks with macadam asphalt.

Galveston county, Tex., will spend \$17,410 in grading and paving with shell 4 1-3 miles of road.

Austin, Tex., will spend \$100,000 in general street improvement.

Grenada, Miss., is asking for bids on 150,000 feet of granolithic walks.

Fairfax county Good Roads Association, of Fairfax, Va., is planning to re-build 20 miles of road at an estimated cost of \$100,000.

Greenville, Tex., has been asking for bids on 146,000 square yards of paving and 84,000 linear feet of concrete curbing.

A company has been incorporated at Linville, N. C., to build a macadam road 22 miles long.

Murphy township, Cherokee county, N. C., contemplates building 30 miles of macadam road.

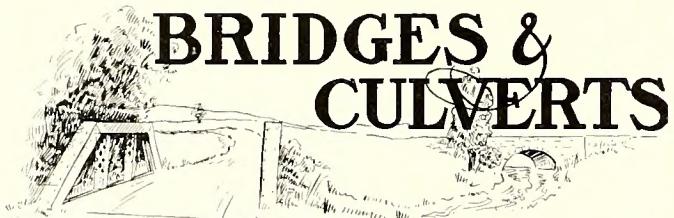
Norfolk, Va., will construct 1100 square yards of concrete sidewalk.

Pineville, Tex., is going to spend \$25,000 for street improvement.

Oklahoma City will pave six streets and spend many thousands of dollars on concrete sidewalks.

At Winnfield, La., Winn parish has decided to spend \$50,000 on road work.

BRIDGES & CULVERTS



Houston county, Ga., will issue bonds for \$100,000 to build bridges in all parts of the county.

Bids are being asked for the construction of a steel and concrete bridge in Montgomery county, Md.

The Shelby county, Tenn., commissioners have awarded contracts for five bridges near Memphis to cost about \$25,000.

Cabell county, W. Va., votes this month on a bond issue of \$300,000 for roads and bridges.

Jefferson and Hardin counties, Ky., are planning to build a bridge across Salt river. It will be 800 feet long and will cost \$70,000.

New Hanover county, N. C., votes May 31 on the issuance of bonds for \$50,000 for building bridges.

Brazoria county, Tex., will spend \$40,000 in building a concrete bridge across Brazoria river.

The Jefferson county, Ala., board of revenue has let contracts for the construction of 10 reinforced concrete bridges, two steel bridges and two sub-structure steel bridges at a total cost of about \$11,000.

Brooksville, Fla., is planning to issue bonds for bridge construction.

Lampassas county, Tex., is going to spend \$7,000 in building a bridge across the Lampassas river.

Morgan county, Ala., commissioners have let contracts for the building of two steel bridges at a cost of \$6,000.

The commissioners of Orange county, Fla., are planning to build a draw bridge across St. John's river at Cooks Ferry.

All of the wooden bridges in Thomas county, Ga., will be replaced by steel bridges as rapidly as possible.

The city of Elvins, Mo., is preparing to ask for bids for the construction of a costly bridge across Flat River.

Wichita county, Tex., has voted bonds for \$15,000 to build a wagon bridge across the Wichita river.

A bridge is to be built across the Appomattox river connecting Matoaca, in Chesterfield county and Ferndale county, Va., at an estimated cost of \$7500. Bids are called for.

At Jacksonville, Fla., the Duvall county commissioners have granted a five-year franchise to a corporation to build a toll bridge across Cedar Creek on one of the principal streets of the city.

Knox county, Ky., fiscal court has ordered the construction of six steel bridges in the county.

Louisville, Ky., is asking for bids on a 100-foot reinforced concrete bridge to cost in the neighborhood of \$15,000.

The State Roads Commission of Maryland, is preparing to build a bridge across the Nanticoke river 1000 feet long and with a 70-foot draw. It will cost about \$50,000.

Caroline and Dorchester counties, Md., are planning to build a bridge across the Linchester river, near Preston, Md.

Union county, S. C., has let contract for the construction of a steel-trussed bridge with steel cylinder piers. The bridge is to be 80 feet long and have 12 foot roadway.

York county, S. C., will build a 100-foot bridge across Crowders creek.

Polk county, Tenn., will issue bonds for \$50,000 to build two modern highway bridges.

Shelby county, Tenn., is preparing to build three fine bridges in different parts of the county.

Brabos county, Tex., has voted \$100,000 of bonds for the construction of two bridges across the Brazos river, one at Brazoria and the other at Columbia. The bridges will cost \$100,000.

The State Highway Commission, of Virginia, has awarded contracts for 12 steel bridges in Southampton county, costing \$21,000.

The contract to build a 1000-foot bridge across the Dan river at Danville, Va., has been let and work will begin soon.

Page county, Va., proposes to build a bridge 500 feet long across the Shenandoah river.

Hanover and King William counties, Va., are getting ready to build a bridge across the Pamunkey river.

An ambitious undertaking is that now determined on by the city of Richmond, Va., which is to construct a reinforced concrete arch bridge across the James river, 1721 feet long. It will cost \$225,000 and will be one of the finest bridges in the entire south.

Nothing pays better than good roads. It costs something to secure them, but they are the arteries which connect city and country, along which the currents of comfort perpetually flow. Bad roads, full of chuck holes, kill time, team and temper.—Earle (Ark.) Enterprise.

Process of Road Improvement in the Southeast Since 1904

By HON. LOGAN WALLER PAGE, Director United States Office of Public Roads

During the last five years many changes have been brought about in road conditions throughout the south. In 1904 the Office of Public Roads gathered information showing the total road mileage and the percentage of improved roads in each state of the union, which was published as Bulletin No. 32. This information revealed the condition of the roads in every section of the country and the efforts then being made to improve them, and the states of the south were more backward in this regard than those of any other section of the country.

Since 1904, however, this section has become actively aroused on the subject of road improvement. Public spirited citizens, farmers, commercial organizations, and the public press have all joined in preaching the good roads propaganda. Taking the states east of the Mississippi and south of Pennsylvania, or what might be called the southeastern states, embracing Alabama, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia, noticeable progress has been made. During this period there have been constructed in these twelve states about 4,000 miles of macadam; about 10,000 miles of sand-clay; and about 1,000 miles of gravel, shell, marl, and bituminous macadam, making a total of about 15,500 miles.

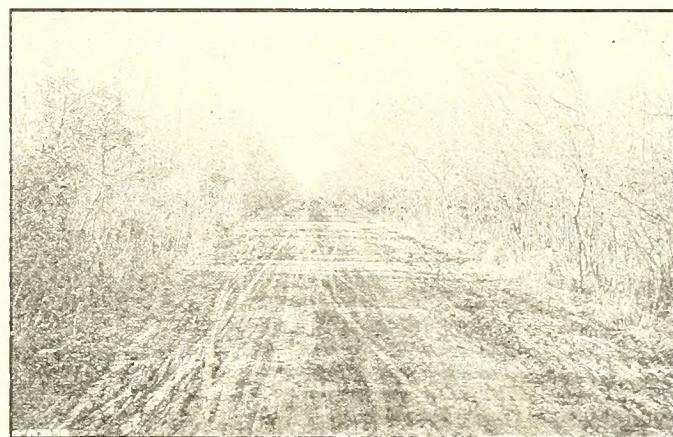
The greatest increases took place in those states building sand-clay roads and using convict labor. All of the states mentioned are building some sand-clay roads, but Georgia and South Carolina take the lead in this respect, while Georgia and Virginia stand first in the use of convict labor on their roads. Georgia's new convict labor law became effective April 1, 1909, placing both state and county convicts on the roads, and as a result about 4,500 convicts are working the roads of the state every day. Virginia also works both state and county convicts on its roads, while a law was passed in West Virginia in 1909 authorizing the working of both state and county convicts. North Carolina also works its state convicts to a limited extent. All of the other states work their county convicts.

Most of the work has been done by counties, and where counties have undertaken extensive improvement, bonds have usually been issued to provide funds. Where, however, the work involved but little or nothing more than the present maintenance of the roads, the old method of statute labor or commutation tax, with probably a very small property tax, has been relied upon. In some instances a sufficient property tax has been levied to provide adequate funds for carrying on the work on a large scale, but this has only rarely been the case. In a good many instances, of course, bonds were voted down at elections, but in most cases they carried by substantial majorities, an aggregate of about \$12,500,000 having been voted.

The twelve states under consideration may very properly be divided in two groups—those not giving state aid, and those having some form of state aid. To the first group belong Alabama, Florida, Kentucky, Louisiana, Mississippi, South Carolina, and Tennessee; and to the second group, Georgia, Maryland, North Carolina, Virginia, and West Virginia. By treating

each of these groups separately, and briefly reviewing their work during this period we can see more of the progress made.

The state of Louisiana furnishes aid to some extent by working state convicts on the roads, but this is done by order of the governor and not by virtue of any statute authorizing it. Louisiana, however, along with Alabama, Mississippi, South Carolina and Tennessee, has a bill pending in its legislature providing for the establishment of a state highway department and the granting of state aid. In 1907 the Tennessee legislature passed an act creating such a department and making an annual appropriation of \$300,000 for road purposes, to be paid from any surplus in the state treasury. As there has been no surplus, nothing has



Tar Macadam Road at Greenville, S. C., After One Year's Use

been done under this law, and last year the legislature passed another act creating a commission to investigate the road conditions of the state and report to the legislature a scheme for establishing a state highway department and for granting state aid. So, up to the present time all work of road improvement in Tennessee has been undertaken solely by the individual counties, and as an evidence of the extent of their activity, 22 counties have issued bonds for road purposes, varying in amount from \$25,000 in Lauderdale to \$500,000 in Madison county and many miles of improved road have been constructed. Macadam is the prevailing type of construction in Tennessee, except in certain sections of the western part of the state where sand-clay is adopted, and the same is true of Kentucky.

In Alabama, Florida, Louisiana, Mississippi and South Carolina, sand-clay is the usual type of improvement. Since 1904, according to somewhat incomplete reports, there have been constructed in Alabama about 1,000 miles, in Florida and Mississippi about 150 miles each, in Louisiana about 700 miles, and South Carolina about 1,400 miles of sand-clay roads. Of course, considerable gravel and macadam roads have been built in some localities, such as Montgomery, Birmingham, and Atlanta, and along the coast some shell roads have been built. In each of these states county convicts are worked and sand-clay roads are thus constructed at a moderate cost, most of the work being

performed by convict labor. A considerable amount of bonds has been issued by various counties in each of these states, except South Carolina, in which only two counties have issued bonds. Sixteen counties in Mississippi and ten counties in Alabama have issued bonds, and several counties in Florida have done likewise, a substantial instance of which being Manatee county which voted \$250,000. Kentucky has the largest mileage of macadam roads, 8,078 miles being reported in 1904 and reports now indicate an increase of about 2,000 miles.

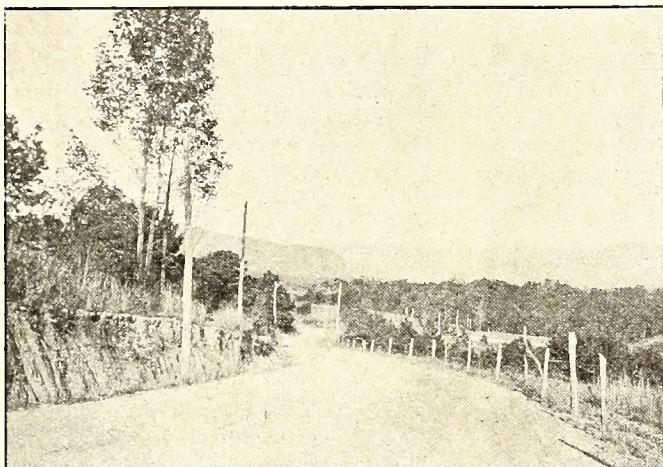
In the second group, embracing Georgia, Maryland, North Carolina, Virginia, and West Virginia, the work rests upon a broader and more substantial basis, in that the states participate with the counties. In Georgia the state only aids to the extent of furnishing convict labor. The law authorizing this was passed in 1908 and became effective April 1, 1909. Both state and county convicts were placed on the roads, and as a result about 4,500 convicts are working the roads of the state every day. A bill providing for a state highway department and state aid has been pending in

Any convict whose sentence does not exceed ten years may be worked on the roads in North Carolina. The state has no state highway department, but a highway engineer is employed by the state geologist to work in an advisory capacity with the county officials in formulating plans for improving the roads of their respective counties. So the state only aids through the limited use of convict labor, and the advice of the highway engineer, no money aid being given. A strong sentiment for road improvement exists throughout the state of North Carolina, and a bill is pending in the legislature looking to the establishment of a state highway department and state aid. Mecklenburg county is quite famous for its excellent system of highways, mostly constructed within the last five years. Other counties are almost equally as active, and the road conditions of North Carolina are being rapidly improved. Sand-clay construction is well adapted to most of the state.

Virginia has a well organized state highway department and an excellent state law. The state highway commissioner is appointed by the governor for six years, subject to confirmation by joint session of the legislature. Two hundred and fifty thousands dollars (\$250,000) is appropriated annually to be apportioned among the counties in proportion to the respective total amounts of state taxes paid into the treasury from such counties the next preceding fiscal year, application for same to be made by the local road authorities, with an agreement for the county and smaller road divisions thereof to contribute an equal amount. The state also organizes and equips convict road forces consisting of felon and misdemeanor convicts of not exceeding five years term of imprisonment, such convict road forces to be worked on the roads of various counties. No county, however, can secure both state money aid and convict labor aid in any one year. Many counties are issuing bonds or levying a special property tax for road purposes and are pushing forward with the work of improving their roads, independent of state aid.

Road improvement in West Virginia is confronted with many difficulties. The state is not agricultural, its wealth lying mostly in its mines and forests, and hence the rural districts are very sparsely populated. The configuration of the soil, being irregular and mountainous, makes grading an essential and expensive feature of the work. Another problem is the scarcity of suitable hard road building material. For this reason the construction of macadam roads is also very much restricted and the situation complicated all the more. There is, however, an abundance of shale throughout the state, which is well suited to the manufacture of brick. In close proximity to this shale is an abundant supply of natural gas which makes excellent fuel for burning the brick, and a high grade brick, well suited to the construction of brick roads can thus be produced at a moderate cost. Conditions therefore, favor the construction of brick roads, but at the same time make the work of road improvement in the state very expensive and necessarily restrict its progress. Bonds have been issued in but one county, and this to the amount of \$7,000. An issue of \$180,000 was voted down in Kanawha county.

An act was passed in 1909 creating the office of county road engineer, to be appointed by the county court and to serve for two years at a salary to be fixed by said court at not less than \$300 nor more than \$1,500 per annum. The county engineer shall co-operate with the state commissioner of public roads but with first regard for the interests of his county. Work in future is to be let to contract. A state highway department



Macadam Road, Asheville, N. C.

the legislature for some time and this bill, or some similar bill, will no doubt ultimately be enacted into law. With an efficient state highway department and an adequate state highway fund to supplement its large convict force, Georgia would very soon rank high among the states in the percentage of improved roads.

Maryland was the first state of the south to adopt the state-aid system. In 1898 the state legislature enacted a law authorizing the Geological and Economic Commission to make a thorough investigation of road conditions throughout the state and the best methods of improving them, together with estimation of cost, and report same to the succeeding legislature. Ten thousand dollars was appropriated for this purpose. In 1904 a new act was passed providing for state aid, the state to pay one-half and the counties one-half, and appropriating \$200,000 annually therefor; and in 1908 this law was amended by an act creating a "State Roads Commission" and providing for the construction and maintenance of a system of state roads, the entire cost to be paid by the state, and authorizing an issue of \$5,000,000 of state bonds to provide funds for this purpose, to be expended by July 1, 1915. This last law is the one now in force, and it is proving very effective. The foundation for the work in Maryland is well established and the progress already made will soon be augmented by the addition of many miles of improved roads.

was established in 1909, with a state commissioner of public roads to be appointed by the governor with the consent of the senate. The State Board of Public Works may furnish as many able-bodied convicts from the penitentiary as can be spared to work on the roads of any county, the county to pay the expense incident to such employment. A state road fund is provided for as follows: Any surplus revenue from hiring inmates of penitentiaries, automobile licenses and fines for violating automobile laws, and the proceeds of special property taxes levied for state aid roads, which is one cent on every \$100 valuation of real and personal property. This fund is to be apportioned among the counties applying for state aid in proportion to the amount of taxes levied and collected therein for roads. It is plainly evident, therefore, that an organization is being perfected by the state looking to the improvement of its roads, and the future work may be expected to proceed on a more sound and systematic basis.

On the whole, the twelve states under consideration are becoming very actively engaged in the work of improving their roads. Progressive citizens and all commercial and public agencies are becoming thoroughly imbued with the spirit of the good roads movement. A strong and aggressive sentiment has developed and projects are being formulated in numerous counties of each state for taking up the work. In fact, the outlook for better roads in this section of our country was never brighter, and in the next few years we may confidently anticipate a progressive movement in that direction.

A Boy Invents Road Drag.

A Davidson county (N. C.) boy has invented a road drag of surpassing excellence and has put it to work. The inventor is Early Austin Beck, eighteen years old, and he lives in Silver Hill township, seven miles from Lexington. His father has been dead for many years and the boy has been reared by his grandfather, Mr. W. A. Beck, a good citizen and ex-representative from Davidson county. The boy has taken an unusual interest in roads for several years. He first built a King Road Drag and used it on the roads running through his grandfather's plantation. This did not suit him exactly and he went to work on a drag that would do more than the King drag and after experimenting for many months he built the drag which he now has in use. The road through his grandfather's farm has been made the best in his township and the township road trustees are now having built several drags after his model.

A Good Example.

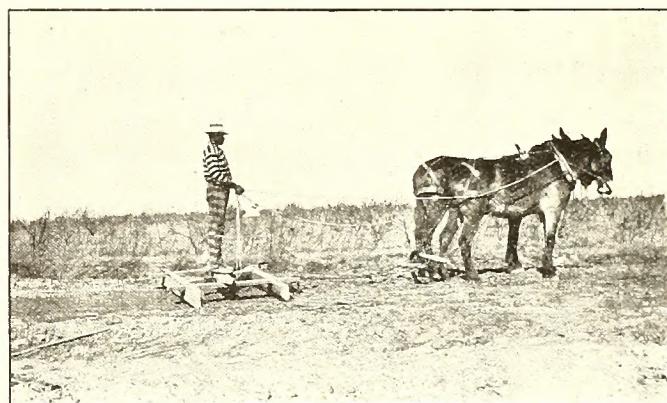
An example worthy of emulation is that set by Grimes Brothers, farmers and millers, of Lexington, N. C. These gentlemen own a big farm north of the city, touching the city limits. A short stretch of the road through this farm has been macadamized but so well is the whole kept that it is impossible to tell, without very close attention, just where the nine-foot strip of macadam ends and the clay begins. The road for more than a mile north of the city is almost perfect, smooth, level and dry in all sorts of weather, and the secret of its fine conditions is the road drag. After every hard rain a team and drag goes over the road and it is thereby kept in almost perfect condition. In striking contrast to this road is the road just beyond the farm of these good citizens. One does not need to be told that "here the dragging ceased," or "we have now passed Grimes Brothers' farm." Ruts and holes abound and travel ceases to be pleasure and becomes a

positive discomfort to man and beast. Even the streets of the city of Lexington cannot compare with this beautiful stretch of road and but one street in the town even remotely approaches it in perfection. The road drag did it all.

All of this work has never cost the county or township a penny. These gentlemen have furnished the labor and teams and have done the work "without reward or hope of reward." It is their hope that the example which they have set will spread and that other farmers in the county of Davidson will see what they have done and go and do likewise. They would teach to their brethren the lesson of co-operation and mutual helpfulness and their practical demonstration has already borne fruit. A number of other farmers have announced their intention of keeping the roads through their farms in first class shape and in every township in the county road drags have been built and are being used.

Bill to Distribute Surplus for Roads.

Representative Flood, of Virginia, introduced a bill in congress April 4th, that has for its object the distribution of the surplus in the treasury of the United States among the several states and territories of the union and the District of Columbia, for the sole pur-



Drag on Sand Clay Road, Milen, Ga.

pose of improving the roads therein. The full text of the bill, which was referred to the committee on Ways and Means, is as follows:

Be it resolved by the senate and house of representatives of the United States of America in congress assembled, That it shall be the duty of the secretary of the treasury at the end of each fiscal year to take an account of all the funds in the treasury of the United States, and after deducting from said sum the amounts required by law to be kept in said treasury, the remainder, if any, shall be declared a surplus.

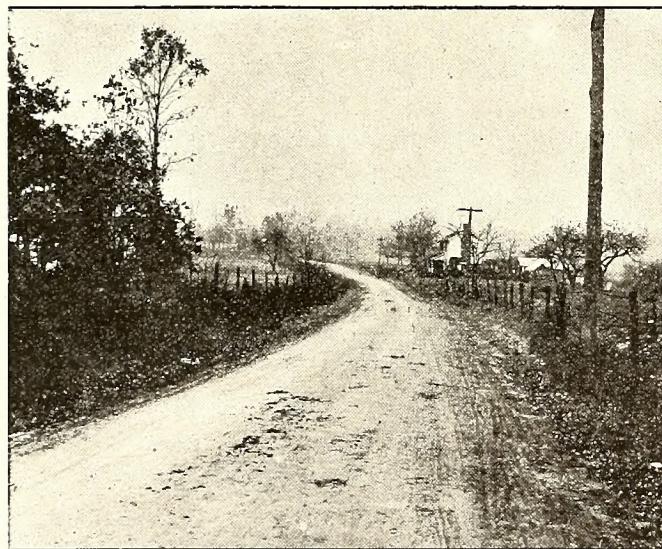
Section 2. That it shall be the duty of the secretary of the treasury to immediately provide for the distribution of said surplus, not exceeding twenty-five million dollars annually during the continuance of this law, on a per capita basis, to the States, Territories, and the District of Columbia, to be computed from the last general census taken by the national authorities, and shall prorate the same accordingly for the sole purpose of improving the postal roads in said states, territories, and District of Columbia, under such rules and regulations as the states, territories, and District of Columbia may provide, and said secretary shall immediately notify the governors of said states and territories and the commissioners of the District of Columbia the amounts due each, and that the same will be paid over to such person or persons as may be duly au-

thorized by said states, territories, and the District of Columbia to receive and receipt for the same.

Section 3. That it shall be the duty of the governors of the several states and territories and the commissioners of the District of Columbia to make a full and complete report to the secretary of the treasury on the fifteenth day of November of each year what legislation, rules, and regulations have been adopted for the expenditure of said funds upon the postal roads, the manner in which the same has been spent, and the results accomplished. And it shall be the duty of the said secretary to submit said reports to congress on the first day of each regular session.

The Charleston-Asheville Highway.

A highway project of more than ordinary interest is that advanced by certain citizens of Charleston, S. C., who would link that seaport town with the mountains of western South Carolina and western North Carolina. The plan is to follow old roads as far as practicable in the most direct way from Charleston to Asheville, N. C. The route may pass through Charlotte, N. C., and Columbia, S. C., though this has not yet been determined on. It is now planned to pass through Greenville and Spartanburg. Both of these towns have signified their willingness to do all that is asked of them and will put up almost any amount of money to get the road.



Macadam Road, Near Lynchburg, Va.

An advance survey has been planned and an effort will be made to interest the farmers living within five miles of the road all along the line and it is thought that this will not be hard to do. Asheville has announced that nothing will be left undone by her patriotic and progressive citizens toward building the road and an organization is being rapidly perfected that will carry it through with a rush.

Much of the road lying between Asheville and Charleston is bad—very bad at that. The plan is to remake these rough spots entirely. The places where there is too much clay will be treated with sand and sandy spots will be clayed, good sand clay roads resulting.

At present it looks like Charleston and Columbia stand some show to get the road from Charlotte to Asheville and much work has been done on the various links of the road. The autoists of Columbia and Charlotte have been working for several months for a highway between these two cities, with excellent prospects

of success. The promoters of the Charleston-Asheville road may alter their plans so as to take advantage of this work already done. This will mean a longer route, but a more interesting one. The most direct route from Charleston to Asheville covers about 300 miles.

National Good Roads Legislation.

Southern Good Roads is indebted to Hon. Louis W. Hill, president of the Great Northern Railway Company, St. Paul, Minn., for copies of recent bills introduced in Congress looking toward road improvement in the United States. The bills are as follows:

A bill introduced by Congressman Shepard directing the office of public roads to advise with and co-operate with state and local authorities as to the best methods for maintaining roads used as rural routes in good passable condition and to inspect and report on the condition of said roads with recommendations to the post office department whenever requested by it to do so. This bill was introduced April 5th.

A bill by Mr. Shepard to establish in the department of agriculture the office of public roads, introduced April 4th.

A bill by Senator Bankhead, of Alabama, to provide for an experiment in the improvement of certain highways by the secretary of agriculture, in co-operation with the Postmaster General, the full text of which appears elsewhere in this issue.

A bill by Mr. Taylor, of Colorado, granting to various states public lands to be sold under certain restrictions and the proceeds thereof to be used for the construction and improving of highways. This bill provides that there shall be granted and conveyed to each state in which there are public lands two hundred and fifty thousand acres of agricultural lands, to be used solely for the purpose of building and improving public highways.

A bill by Mr. Massey, to establish in the department of agriculture a bureau to be known as the Bureau of Public Highways, and to provide for national aid in the improvement of public roads. This bill calls for an appropriation of \$24,000,000 to be available at the rate of \$8,000,000 per year, the amount to be distributed under competent supervision to the states and territories according to population.

Millionaires Plan Highway Project.

The following special from New York city to the Chicago Record-Herald, dated March 1, is especially interesting to all good roads advocates:

In the office at 115 Broadway of the National Highways Club, an organization recently incorporated under the laws of New York, H. D. Layman, president of the club, stated to-day that forty multi-millionaires are back of the enterprise of building national highways without taxation.

The plans of the National Highways Club contemplate the building of a 144-foot wide highway from this city to Washington and then an extension of the thoroughfare to other large cities. The estimated cost is \$100,000 a mile. This means an expenditure of nearly \$23,000,000 for the New York to Washington highway alone. Mr. Layman said the estimates were made by the club's constructing engineer, Captain A. N. Milner, said to have been a former officer of the army.

The highway, according to plans shown to the reporter, provided for twelve-foot sidewalks or footpaths on each side, two twenty-foot wide public roads for animal traffic only, and two twenty-foot roads for automobiles and motorcycles. Next come two trolley tracks in the center of the thoroughfare and two roads for commercial traffic.

A Typical Legislative Record.

Other states, notably North Carolina, can sympathize with Nebraska, as the state of cyclones, blizzards and William Jennings Bryan is not the only state that was afflicted with a do-nothing legislature. The Hastings (Neb.) Tribune pours some hot shot nito the legislature in the following:

It was all wind and no work the Nebraska legislators furnished towards assisting in bringing about a condition of better roads throughout this state.

The legislature started out with a brass band flourish when the subject of good roads came up, and the people were given the idea that at last something was going to be done for the farmer. But it appears that the politicians in the legislature were afraid of breaking up county political machines, so there was nothing doing.

We had hoped that the time had come when the improving of the high way was eliminated from politics, but apparently the political itch is still preventing progress in Nebraska.

A fine macadam road has just been completed between Roanoke and Cloverdale, Va., the latter town in Botetourt county. Practically all of the road was built by public subscription. The road cost \$18,220.58. Citizens of the city of Roanoke came across with \$6,184 and in Roanoke county, outside of town, \$3,443.50. was raised. Botetourt county citizens gave \$3,537. Most of this was given in amounts of \$5, \$10 and \$25. The examples of these good citizens is worthy of emulation.

An Irish Good Roads Crank.

The legislature of Minnesota has passed a road law that places that rocky, ice-bound state far in the van of the progressive states of the union and this great forward step is the direct result of the labor of Robert C. Dunn, a fighting Irishman, familiarly known throughout the state as "Baldheaded Bob." He is a character of the unique and unusual sort and because of his undying devotion to the good roads idea, the following appreciation of him which appeared recently in a Minnesota paper is here given:

Robert C. Dunn's "Good Roads" bill has passed without opposition. If this bill becomes a law, and there is every prospect that it will, "Bald-headed Bob" will have accomplished more to establish himself as a public benefactor for all time to come, than he would have been, had he been fortunate enough to have been elected governor for life and served out his full term. If this measure is enacted, Minnesota will have put herself on record as the first state to adopt a sensible, feasible system of establishing permanent and uniform high-ways within her borders. There are others besides Dunn, who are entitled to much credit for bringing this about. Messrs. Congdon and Knapp, when the bill was under discussion made short speeches that will become classics in "Good Roads" literature. The bill had many other able, earnest advocates and supporters, but to "Bob" must be accorded the lion's share of credit for this achievement.

Bob began talking "Good Roads" before he left the "Old Sod" and he has been talking them ever since in season and out of season in four different languages, Irish, Lumber-jack and Profanity. He talked "Good Roads" when he had to talk to himself for he could get nobody to listen to him. He has worn his good wife almost to a shadow with perpetual conversation on the subject and there have been times when his children were compelled to go up and sit on the house-roof to escape his everlasting flow of words in exploitation of his favorite theme. He has smashed in-

numerable tables in illustrating the idea in public speeches. He has filled the columns of the Princeton Union with lucid, eloquent articles on the topic. He has worked for "Good Roads" in the daytime and dreamed about them through all the night long, and now that he has achieved the desire of his heart surely no one will begrudge the grizzly, grouchy old warrior his hour of triumph.

W. S. FALLIS, WILSON, N. C.

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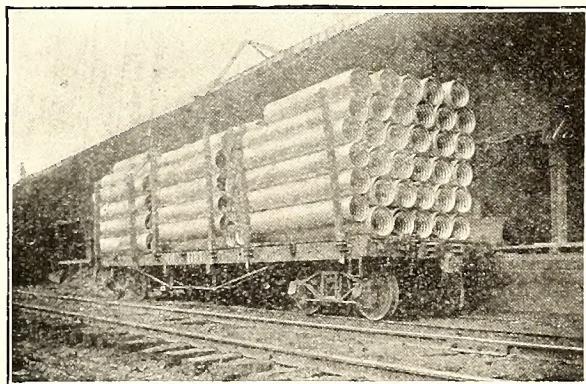
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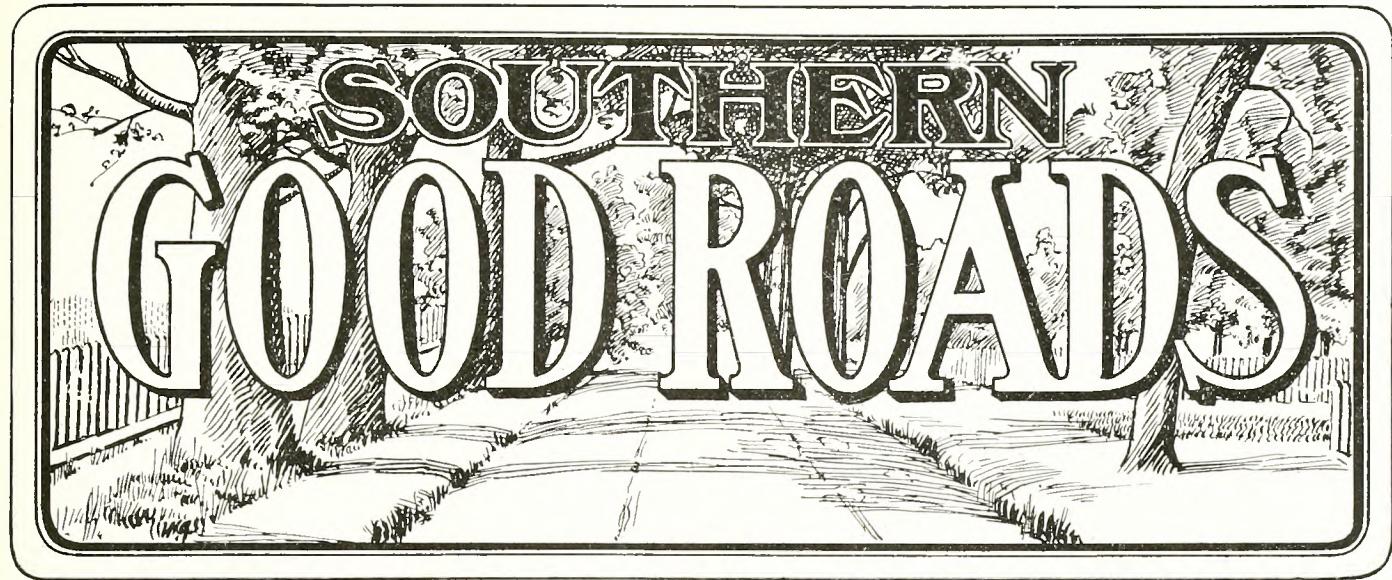
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State Supervision of Public Roads

By DR. JOSEPH HYDE PRATT, State Geologist

State supervision of public roads, if it is to be of the greatest value to the public road construction of any state, must mean to some extent at least state aid to counties in public road work. What form this state aid to counties shall take will vary in the different states; some will make direct appropriations to assist the counties in the actual construction of their roads, others will utilize state convicts in this work, and still others may simply give engineering assistance to the counties.

In travelling across many of the states, especially in the south where the public road work is entirely under the control of county or township officials, one notices many types of roads, methods of construction, peculiar locations, and, what is more in evidence than anything else, the fact that the state seems to be checked with stretches of good road connected by stretches of bad road and that there are no long stretches of good roads extending across two or three counties. This is of necessity the case where the public roads are under the control of the individual county or township officials, except perhaps in the more progressive counties. Each board of county commissioners have their own ideas regarding location, construction, and maintenance of roads and often these ideas are very different from those in the adjoining township or county. Frequently these officials have had little or no previous experience in this line of work and many of them are not familiar with good roads—that is, roads that are good 365 days in the year. Conditions would not be as bad if all the county boards of commissioners could be induced to employ competent engineers to supervise the road work, but this will be impossible in the counties in many of the southern states for many years to come, and unless the state is willing to provide engineering assistance to the counties, many

and perhaps the majority of the counties will continue to expend the people's money in public road construction in the same manner as it has been done for years past. The old idea that anybody can locate and build a road is antiquated and perhaps the wisest expenditure of a portion of the road fund of a township or county is that which is spent for the services of a competent road engineer to have supervision not only of the construction but also the location and maintenance of the roads.

Without state supervision it is absolutely impossible to get any uniform method of road or bridge construction, any uniform method of maintenance, or any uniform location and grading. All of these conditions could be overcome if the state would take supervision of its public roads. In doing this it is not necessary for the state to have charge of the actual construction or handle any of the funds raised by the townships or counties for road work but it would mean that the state would designate what kind of road should be built, where it should be located and how maintained. The State Highway officials would prepare for the county plans and specifications for the construction of its roads and bridges. The state would also have supervision of the construction, hold the contractors to their plans and specifications and also hold the county officials to the plans and specifications where they build the roads by day labor instead of by contract. The state would also prepare plans and specifications for bridge work and the county would not pay for the bridge until the work had been passed upon by the State Highway Engineer. It is a very safe estimate to state that many of the southern states would save from \$400,000 to \$600,000 a year in their public road work if the money were spent under the supervision of State Highway Engineers. Also it is safe to say that many of the southern states would save from \$25,000 to \$100,000 in the construction of their bridges, if the State Highway Engineer had approved all the plans for the bridges, their location, and had passed upon their con-



struction before payment was made. In this connection many examples could be cited of bridges having been constructed for counties and townships where they have not been located in the right place, have not been the kind of bridge required, and where they have not been constructed according to even the original plans, and, after paying for the bridge, the commissioners have had to spend many hundred dollars to get the bridge in the first class shape.



Macadam Road from Catawba River to Mooresville, N. C.

If there can be such a saving in the revenue raised for public road construction, is it not strange that the people of the state do not demand that the state shall take the supervision of public road construction?

It is not because the officials or the people do not realize that a great deal of the road fund is wasted each year both in construction work and in the maintenance of the road. There are few townships or counties where the road work has been carried on entirely successfully, and even where this has been accomplished there is no connection between that county and the adjoining ones by good roads. In counties where the township is the unit there is no uniformity of road location or construction and in many instances no two townships in the county are connected by good roads. There must be some strong reason for this condition, and it seems to me that it is, first, the selfishness of the township, and, second, the feeling so prevalent that the county must be independent and control its own actions. This is very true in North Carolina and I believe is also true in many of the other southern states. It seems to me that the best results in this country can only be obtained when we consider first the state as a whole, then the county and last the township. How often we have seen statewide measures proposed and acknowledged to be the best thing for the industrial advancement of a state hampered and retarded in their usefulness by legislatures passing measures permitting certain counties to be exempted from an act because those representing the counties wished them exempted regardless of the fact that it nullified to a large extent the effectiveness of the act. This means that many of our state legislatures are considering the township before the county and the county before the state. Until we can change this idea now prevalent among so many of our people, that the county comes before the state and the state must not interfere with the actions of the county, it will be hard to obtain state supervision of public road construction. I believe, however, it will be accomplished and in the near future, for the

reason that the people now desire and demand good roads all over the south, and will soon insist that every county be provided with good roads, and that the revenue raised for this purpose shall not be squandered. When a majority of the people demand good roads, they will get together and in the end have passed the measures which promise the best results, which now seem to be state supervision of public road location and construction, accompanied undoubtedly by some form of state aid. The educational movement in North Carolina and the other southern states, when first started, met with the same kind of opposition that the public road movement is now receiving, and for the same reason; i. e. the counties thought that they knew how to take care of their school questions without any interference whatever from the state. And yet, those who were advocating state supervision of education continued their work untiringly, with the result that the states have almost without exception taken the direct supervision of their educational work. Owing to the success of this form of state supervision it is now believed by all to be necessary for the best educational advancement of any state, and I am confident that after we have had state supervision of public road construction in vogue for a number of years it will be acknowledged by all to be the best solution of the problem of how to obtain the best system of good roads throughout any state.

When you consider the states which have state supervision of public roads, such as Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, and Maryland, you will find that these states excel all the others in their systems of good roads, and, wherever the system of state supervision has been inaugurated, it has continued to grow and there has never been any question of discontinuing it.

The benefit derived by a state from the supervision of its public roads is the continuous lines of good road extending from county to county. These would be constructed uniformly in regard to width, grade, drainage, etc.; they would be maintained consistently; and there would be no breaks in the line of road by heavy, sandy places, mud holes or steep grades because one township or county had refused to connect its roads with that of another. The state having supervision would necessitate that all the links in the system should be made uniformly good. Experience has proved that this cannot be done without state supervision, and I personally have found, in traveling through the various southern states, many bad places just on the outskirts of a county or township which have effectually decreased the efficiency of the road because, if hauling freight, you have to load the wagon for the bad places, and if traveling for pleasure the bad part of the road often makes more impression on the traveler than the good portions.

As stated above, it will be rather difficult to obtain state supervision of public roads unless the state will assist the counties in some form or other in their road work. There are a number of ways in which a state can assist its counties in the construction of public roads, and perhaps no phase of state aid is of more importance to the public road work than engineering assistance. While some counties have provided competent road engineers to have supervision of the location, construction, and maintenance of their public roads, the majority pay little or no attention to the need of the employment of such engineers; consequently, there is needlessly wasted each year in all the southern states a large amount of money which could readily be saved to the county if expended under the supervision of competent road engineers. I do not believe it is put-

ting it too strongly to say that at least one-tenth to one-fifth of the time and labor expended in the southern states in public road work is absolutely wasted. The need of engineering assistance has been felt in North Carolina, and nearly all of the conventions held throughout the state during the past year or two have passed resolutions regarding this phase of public road work.

Another form of state aid is the use of state convicts in public road construction. This question is one that is being agitated throughout nearly all the southern states, as well as many northern and western states; and, where it has been tried, it has been decided in nearly all cases that it is in the end the best thing that could be done with the convicts. In North Carolina this question is being given serious consideration, although conditions are different in this state, inasmuch as a large number of the convicts are sentenced directly to the public roads in the different counties, and there is, therefore, a much smaller number of state convicts than in any of the adjoining states. Thus, in North Carolina we have only approximately eight hundred state convicts, of which a certain number at the present time are needed for the care of the prison and for running the state farms. The balance of the able-bodied convicts, however, should be used in public road construction; and the sentiment in the end will probably be to work all state convicts on the public roads. Resolutions regarding this have also been passed by a great many of the organizations which have held conventions in North Carolina during the past two years.

A number of the southern states, such as Virginia and Georgia, are utilizing all their state convicts for public road work with splendid results. In this connection, however, the work of the highway engineers is of the utmost importance, and any state utilizing convicts should provide the most competent road engineers to plan out and supervise the road work.

Another form of state aid is the appropriation by the states of funds to assist the counties in the actual construction of their roads. Several southern states, as Maryland, Virginia, and Kentucky, have already adopted this plan of state aid, appropriating out of the general treasury a certain amount each year to be divided up amongst the counties of the state for public road construction, provided the counties themselves raise a like amount. The counties have to construct the roads according to specifications and plans drawn up by the State Highway Engineers, and, after the work is done, it has to be certified to the Auditor or Comptroller that the work has been done according to the plans and specifications, and then the state pays one-half the cost of the road, or in some instances only one-fourth or one-third.

New Jersey was the first state to enact the "State Aid Law," which was passed in 1891 and is still in force. The result is that New Jersey has one of the finest systems of public roads in the country. The carrying out of these various forms of state aid will necessitate the establishment of a State Highway Department or Commission, which would have charge of the road work in the state.

The benefits the individual county would reap from the establishment of such a department would be:

(1) Great saving in the expenditure of the money derived from a bond issue or special tax. Under the present system a large proportion of the county's funds is paid for experience—and the usual result is a good deal of experience but very poor roads.

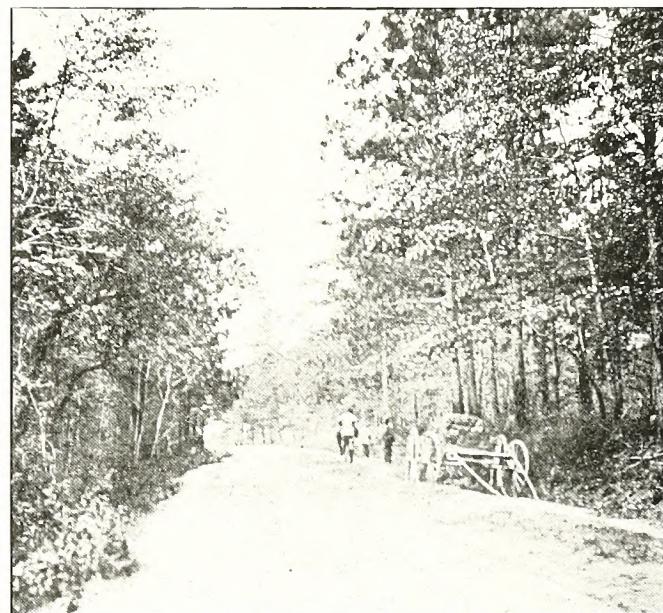
(2) Roads properly located, irrespective of personal interests or politics.

(3) Roads constructed out of the best and most economical materials available for each county. Only a

skilled engineer of wide experience is capable of judging as to the proper materials for the construction of good, permanent roads.

(4) The advantage of the most up-to-date knowledge in road building, as such a department will keep in touch with all modern methods of road building, bridge building, etc., and conduct experiments of its own to ascertain whether such methods can be used economically and effectively in the different sections of the state.

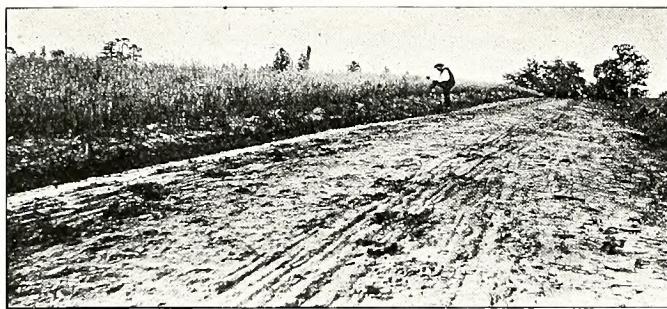
Another way in which the state can very materially and advantageously assist the counties in the construction of their public roads is for the state to lend its financial support to the counties in obtaining money for the construction of public roads. The state, as we all know, can very readily borrow money at four per cent. interest, while the county has to pay, on an average, at least five per cent. on all the money that it borrows. It requires approximately one per cent. per year on a forty year loan to provide a sinking fund which, put out at compound interest, will equal the principal of the loan. Thus, any county issuing one



Dr. Joseph Hyde Pratt helping to unhitch an unruly horse on a Craven County road, near Havelock on the Central Highway

hundred thousand dollars worth of bonds would have to provide, besides the yearly interest, a sum equal to \$933 per year, which, put out at five per cent. interest compounded, would in forty years provide the principal of one hundred thousand dollars. The county, therefore, has to provide six per cent. each year to take care of its bond issue. Now the difference at which the state can borrow money, four per cent. and the county, five per cent.—i. e., one per cent.—will take care of the principal of any loan when it becomes due. If the state then would borrow money at four per cent. and loan it to the counties at five per cent. the one per cent. additional interest which the county would pay to the state would take care of the principal of the bonds issued by the state; and the counties, after paying the five per cent. interest semi-annually for forty years would have provided the state with an amount sufficient to pay for the principal. This would mean that all the counties would have to look after would be the five per cent. interest, and they would not be worried or bothered with the principal, as this would be taken care of by the state. By such a meth-

od the state would not have to advance any money on the principal or for interest, and would simply take advantage of its credit in borrowing money at four per cent. and giving the counties the benefit of this. Those counties which have issued bonds and are paying interest and providing a sinking fund know that it takes approximately one per cent. in addition to the interest to provide for the sinking fund.



Section of newly graded road through Phillips Brothers farm, near Carthage, Moore County, N. C., showing need of Split Log Drag

It is believed that such a provision will be of inestimable value to the county in providing funds for the construction of its highways.

As one will readily realize, no state will give any form of state aid without making provision that the state shall have control of how the road shall be located and constructed, so that any form of state aid is bound to mean state supervision of at least that por-

tion of the public roads in the construction of which the state has assisted in any of the forms mentioned incorporated towns.

Public roads are not simply for the use of the citizens of the county in which they are located but for the citizens of the whole state and, while in former years the use of the public roads in any county was confined largely to the citizens of that particular county or a portion of the adjoining county, at the present time conditions have changed and the public roads of a county are now being used not only by its own citizens but by people from distant parts of the state and of other states. This is due largely to the automobile which has made it possible for the people of a state to travel from one part to another over the public roads in a very short time. Inter-county roads are being more and more used for handling produce to and from market, especially in those sections where hard-surfaced roads have been constructed. For this reason it is fair and just that the expense of constructing the improved roads of a state should be met partly by the state. In doing this, however, as I have stated before, the state will insist, and it is her right to do so, that she shall have supervision of the location and construction of those roads for which she is helping to pay.

Another point which must be considered in the state supervision and state aid in public road work is that the work should be kept just as far as possible out of politics. In other words those who are to have charge of the location and construction of the roads should be appointed entirely from the standpoint of qualification and ability rather than political affiliations.

Principles Which Should Govern in Road Administration

By HON. LOGAN WALLER PAGE, Director U. S. Office Public Roads

There are no better examples of high grade road construction than can be found to-day in the United States. It is equally true that the world possesses no better examples of poor maintenance. While construction is the first essential to road improvement, maintenance is of equal importance for the attainment of a perfect system, and, as a prerequisite to good maintenance, a thorough administrative system must be provided. While it is necessary that we devote immediate attention to the study of methods of construction to meet modern traffic conditions, and while the deliberations of great conventions will undoubtedly prove of real value, we should carefully guard against becoming too much absorbed in problems of construction to the neglect of the equally important problems of maintenance. The one point of clearly demonstrated superiority which the European road systems possess over our own is in their exceptionally effective administration and maintenance.

The whole subject of road improvement in the United States is to-day in a transition stage. We are not only endeavoring to meet the new conditions of traffic with new forms of construction, but our various state legislatures are actively engaged in an endeavor to meet the demand for road improvement by the enactment of suitable legislation and the appropriation of necessary funds. The fact that we are in this transitional stage makes it not only opportune, but imperative, that our legislation be concise, practical and ef-

fective to the end that we may obtain and continuously maintain perfect systems of roads at the lowest possible cost. Although many of our states are appropriating large sums of money for the construction of new highways, yet few of them are making adequate provision and appropriation for the maintenance of these highways, the result being that roads are being constructed in short sections each year, to be worn out before continuous lines of road are completed. We now have a real and lasting opportunity to render a great public service by urging the adoption of those principles which have proven by long experience in other countries to be sound and effective.

The first and basic principle which underlies the most constructed, they may be said to begin nowhere and successful of European systems of road administration, and which is the basis of the most successful of our state systems in America, is centralization.

We have tried many expedients in America in the management of our public roads, among them the toll road system which involves private control of a public utility. This is manifestly unsound in public enterprise, and it is a source of gratification that the toll road system has been largely abandoned throughout the country by the more progressive states, in favor of some system of public control and public expenditure. We have tried a system of public control through local units, involving the principle of extreme localization, in which the counties or their subdivisions were

made the unit of control, and this system unfortunately prevails to-day in approximately half of the states. Even in the states which have followed a progressive policy during the last few years, by far the larger portion of the roads is still under local control. This system is manifestly a failure, and we have found by careful investigation that the annual expenditure for road improvement in the United States is about \$1.05 per capita, which on the present basis of population would be upwards of \$95,000,000 a year. Our roads are admittedly the poorest to be found among any of the foremost nations, and the examples of counties which have obtained a reasonably passable system of roads commensurate with their expenditures are exceedingly rare. It is not merely a single county here and there throughout the state that should have improved roads, but continuous lines of improved roads should traverse the entire state.

The superiority of the centralized system over the system of local control is made more manifest when we compare the experience of England and France. The roads throughout England are almost uniformly excellent, but by reason of their lax system of local control, the cost of maintenance is very great. The annual expenditure for 1905 and 1906 was a little over \$78,000,000, and, as the total mileage is slightly less than 150,000, it follows that the annual expenditure per mile was about \$520. In comparison with this, the French roads, under a highly centralized system, are kept in a perfect state of repair at an average cost for the same period of about \$244 per mile. A comparative analysis of the two systems reveals the cause of this marked difference in expenditure. The English system provides a large number of petty units, each under the control of an official independent of any central authority, in consequence of which uniformity of methods is impossible. While one official may conduct his work with skill and economy, it is scarcely reasonable to expect all of the officials to be equally

efficient, consequently the saving in some of the units will be far more than offset by the waste in others. Furthermore, the incompetency of a large number of officials is more difficult to remedy than the incompetency of a single official. It is manifestly impossible for a small unit with limited revenues to secure the assistance, advice and supervision of a high-grade engineer, where in a centralized system the cost is so widely distributed as to constitute but a slight burden on each of the smaller units. In the purchase of supplies and equipment, a large saving can be effected by centralization, while in the reduction of personnel, and in standardization of methods and equipment still greater economy results.

In applying this principle to road administration in America, it must be apparent that the smallest unit for effective control is the state. Our own experience since the inauguration of the state-aid plan by New Jersey in 1891 has been uniformly in support of the wisdom of this contention. There has not been a single instance in which a state having once adopted in any measure the principle of state control and state aid has retrograded from its position. On the contrary, in almost every case increased power has continually been given to the highway departments of the states and larger appropriations granted. Not only has this been true, but it is a matter of common observation that the state roads throughout the country are far superior to the local roads, while in percentage of roads improved, the state-aid states are far in advance of those which are still adhering to the local system.

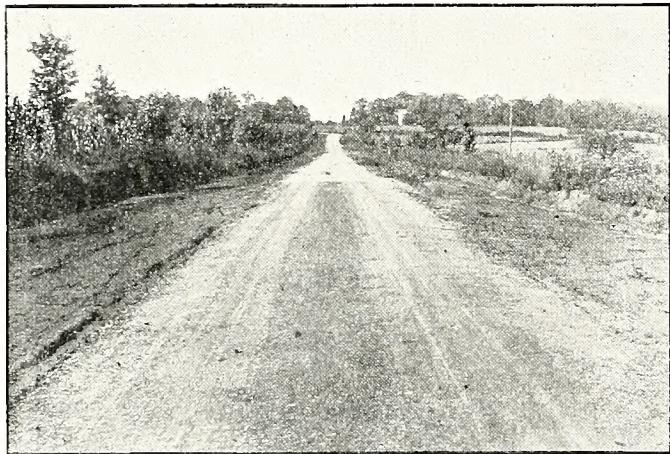
A particular phase of the centralized system which merits the fullest consideration is the tendency of the state-aid system to build and maintain a continuous trunk-line system entirely at the expense of the state. State-aid legislation has followed in a large measure a process of evolution, the earlier laws being designed merely to give aid to the local subdivisions. Later the



Road Between Fayetteville and Mount Hope, West Virginia, After Improvement, Showing the Road Bed Crowned With Ditches on Either Side and in Shape For the Split-Log-Drag

principle of state control was emphasized in increasing measure, until to-day we have several examples of complete state supervision over definite lines of road. It is not only my hope, but belief, that every state will eventually adopt a system the most important essential of which will be the trunk line road supplemented by intercommunicating roads, in which a graduated system of state control will be exercised and which will receive state-aid according to their importance.

I desire to call particular attention to the system prevailing in New York, which is the product of legislation extending over a period of 12 years, beginning in 1898. Until 1898, a system of extreme localization prevailed in New York. In that year, legislation was enacted providing that the small local units should receive a certain percentage of aid from the state, the amount depending upon the local expenditure. Thus the first step was far short of the highly centralized system now prevailing. In 1903 another step forward was taken when the legislature adopted a resolution proposing an amendment to the state constitution authorizing the issuance of \$50,000,000 in state bonds for the building of state roads. This was ratified by the people in 1905, and the legislature of 1907 provided



A Good Road Near Mobile, Ala.

for a system of state aid which involved supervision by the state highway department, the state control, however, pertaining only to the roads built with the aid of state money. The tendency toward a more effective administration was apparent, however, in the appointment of a committee by the legislature in 1907 to undertake the revision of the state highway laws and propose a system. This report was adopted, and the new law became effective at the beginning of 1909. It provides for the construction of trunk lines to be built and maintained entirely at the cost of the state, and a tentative system was approved aggregating a length of about 2800 miles. The county roads, comprising about 7500 miles, are to be improved by the state, county and town jointly. The remainder of the roads, aggregating between 65,000 and 70,000 miles, are to be maintained and repaired by the towns with the aid of money appropriated by the state on condition that the local officials conform strictly to the methods specified by the state highway department.

This, in my opinion, constitutes an admirable arrangement, and the New York law, in my judgment, is to-day more nearly perfect than any of the state laws. Most important of all, New York has adopted a continuous system of repairs consisting of regular patrols, whose duty it is to maintain the roads at all times.

Summing up the advantages of state control of road improvement, we may confidently claim for the system that it makes practicable high grade, skilled supervision, as the funds will be adequate to employ the best men available. It should result in greater economy in both construction and maintenance, for the reason that a relatively smaller personnel will be required for administration and supervision, lower prices should be obtained in the purchase of equipment and materials, and a more accurate system of cost keeping and accounting is made possible. This system also should be productive of a far greater mileage of completed road, as it contemplates the construction of continuous lines of road rather than short, isolated stretches. To emphasize this point, we need only to recall an average instance of the distribution of county road funds among various precincts. The distribution becomes so minute under the system of local control that the construction of any appreciable length of road is impossible. In consequence, even where short stretches of road are end nowhere, scarcely benefitting traffic, and, by reason of their location between stretches of unimproved roads, their proper maintenance is impracticable.

Aside from considerations of economy, we should not overlook the very important consideration that the expenditure of state funds tends to equalize the distribution of cost in a far more equitable manner than is possible under local control, for the reason that state revenues are derived from city and country as well as the large corporations, consequently, every interest in the state contributes to this important work of internal improvement.

Another point which I desire to emphasize as essential in any system adopted is that skill and knowledge of road construction should be required of all officials having direct charge of road improvement. If we find it necessary to maintain technical schools for the training of military and naval officers, if in the states and counties we find it necessary to hold rigid examinations to test the fitness of teachers for our public schools, if the civil service system, which is generally approved in all units of government, is wise, why should we not require suitable qualifications on the part of the men who are to build and maintain our roads? If we turn to European precedents for light on the subject, we find that the two countries which are given credit for having the best road systems in the world, namely France and Switzerland, require all of their highway engineers in public service to possess diplomas from the schools of roads and bridges maintained by the respective governments.

Several of the states have within the past few years enacted legislation providing for the appointment of a highway engineer in each county to have entire charge of road work. This is an excellent provision, and is exactly in line with the policy I am advocating. The fact must not be overlooked, however, that there are some counties which can ill afford to pay a salary sufficient to secure a well qualified highway engineer. To meet this difficulty, the law should provide for the consolidation of several counties into a road improvement district, where it seems necessary, at the head of which should be placed a highway engineer whose salary and expenses would be borne proportionately by each county.

It is a matter of sound business policy to require that all of our road taxes be paid in cash. The wisdom of this plan is so apparent as to need no vindication. The building and maintenance of roads is simply a great business enterprise conducted by the public. If a private enterprise could not succeed with its revenues partly paid in worthless labor and partly in cash, we

have no right to assume that a public enterprise would succeed any better. Under normal conditions, I would most earnestly advocate the payment of all road taxes in cash, rather than in labor, but sometimes there are conditions which, in their relation to this subject, can scarcely be considered normal. I have in mind the problem throughout the south, where a large element of the population is capable of paying road taxes only in labor. In these states, a change in the road laws relating to taxation for road purposes should only be made after a most careful consideration of these complex conditions.

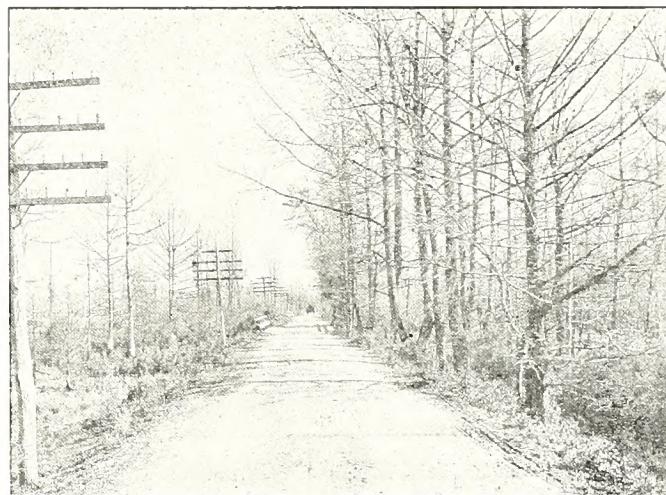
In our eagerness to correct the evils in our existing systems of road administration, we are apt to tear down faster than we can build up. I would, therefore, particularly urge that before we adopt sweeping legislative reforms abolishing statute labor and toll roads, we make sure that we have a better substitute. I have in mind one or two instances where toll roads were abolished and no substitute provided, the result being that the road, which was poorly maintained before, received absolutely no maintenance after the law went into effect.

In dealing with the subject of actual maintenance aside from its administrative features, it must be evident that the only wise and safe plan is to provide, upon careful estimates, an actual cash appropriation sufficient to maintain every mile of new road that may be constructed, and at the same time to provide a practical organization and a clear-cut, specific plan where by this maintenance fund can be expended to the best advantage. It is necessary that the maintenance fund be kept absolutely separate and distinct from the construction fund, as otherwise the construction fund will be sure to borrow continuously from the maintenance fund, and the intent of the law will be nullified. Continuous and systematic maintenance is the only solution of the maintenance problem. Damage to a road either from traffic or weather can be repaired at its inception with a slight expenditure of time and money, but if allowed to go without attention for a considerable length of time, will certainly involve great outlay for repair and may even threaten the very existence of the road. The patrol system as practiced abroad and as established in the state of New York possesses many points of superiority over our usual practice of making repairs once or twice a year or when absolutely necessary. A distinction should be made between the continuous maintenance by the patrol system and extraordinary repair such as failure of a bridge, culvert, or a washout. An organization permitting of such repair should exist independently of the regular construction and maintenance forces.

The Office of Public Roads has used its utmost endeavors to bring about the necessary reforms along these lines, as far as conditions have permitted. It is our endeavor to remedy the lack of knowledge of ordinary road construction in rural communities by sending out engineers to advise fully with the local officials and to give them the benefit of careful instruction in methods of construction and maintenance. These engineers are assigned upon the request of the local authorities, the entire expense of such assignments being defrayed from our own appropriation. We are endeavoring to aid in some degree in providing skilled highway engineers to meet the demand, by training every year in all branches of road work a small number of engineer graduates. The instruction given these young men is not gratuitous in the usual meaning of the word, so they render ample service in return for the instruction and the small compensation which they receive. We issue from time to time bulletins bearing upon various

phases of road work, and when practicable, our engineers deliver lectures in local communities, in which they give information that will aid in solving the local road problems. Our investigative work is devoted to the various problems in connection with the construction and maintenance of roads, among the most important being the adaptation of methods of construction to meet modern traffic conditions. Another important project of an investigative character is comprised in our various experiments looking to the utilization of by-products in road building. Our laboratories also analyze and test road materials to determine their relative value and suitability for road construction. This work is done free of charge for any citizen of the United States. A number of specialized projects arise from time to time through our study of road materials, which it is unnecessary to deal with in this paper.

In conclusion, I wish to state that if we are to accomplish these needed reforms, we can only do so through the medium of organized effort, and this or



Macadam Road Near Jackson, Tenn.

ganized effort should not be restricted to the holding of a few conventions here and there, but should include continuous and unremitting effort. I wish further to emphasize a point which I consider vital to the success of any great road organization, and that is that it should be built from the bottom up, or in other words, that it should be composed of an aggregation of small local associations, which should be in intimate touch with local needs and problems, and which would give a national association a thoroughly representative personnel.

Great Good Roads Meeting in Richmond Sept 12-15.

The greatest good roads gathering the nation has ever known will be held at Richmond, Va., September 12 to 15, 1911. The first annual meeting of the American Association for Highway Improvement will be held in that city on that date and President Taft is expected to make the principal address. Dr. Logan Waller Page, Hon. W. W. Finley, president of the Southern Railway Company and Senator Martin, of Virginia, called on the president last week with the view of arranging for his appearance for the meeting.

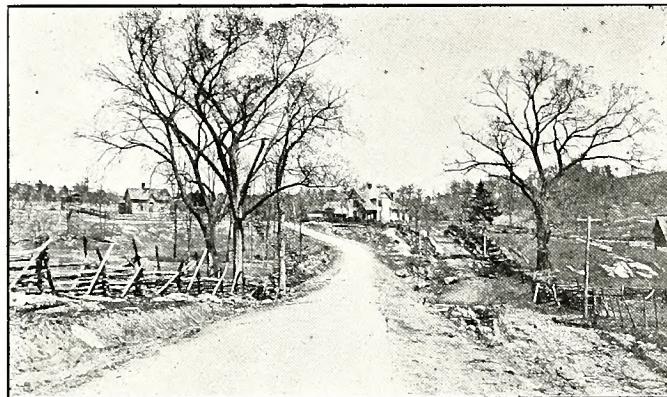
This association is the greatest organization of its kind ever effected. It embraces within its members all of the leading good roads organizations of the nation and all them will be represented at Richmond.

Effects of Good Roads on Immigration

By COL. M. V. RICHARDS, Land and Industrial Agent, Southern Railway

It is customary, as we all know, to preface a public talk or speech with some perfunctory remarks; but mine will be limited, at least, in expressing my sincere pleasure that I am permitted to be with you, to participate in your deliberations, and to make my contribution to the subject in the interests of which this congress is assembled.

The topic assigned me, "Effects of Good Roads on Immigration," while bearing directly upon the main proposition that good roads are followed by certain results, has its limitations. Substantially, it implies a single, plain proposition—"Is immigration into a given section influenced by the presence of good roads, and if so, how?" The answer can be given instantly, in one word—Yes. The balance of the proposition can be treated concisely, and needs no long-extended speech, no disursive arguments.



Macadam Road, Hamlin County, Tennessee.

Any opinions I may advance in dealing with this question are based, not at all upon abstract theories, but upon observations extending through a long period of years devoted to the study of material conditions in the south mainly, and incidentally in nearly every portion of the United States. One of the most important duties of the Land and Industrial Department of the Southern Railway is to watch local conditions and study local features in every part of its territory. If a district or town is not progressing we seek the cause, and undertake a remedy. If a section is poor in public improvements, it is at a disadvantage, since it fails to attract strangers.

Now, apply the rule to an agricultural section. We will say that the department I represent has induced a citizen of a northern state accustomed to the use and presence of good roads to visit the south in search of a home for his family. He is seeking better conditions and not worse conditions than exist in his neighborhood. We equip him with information and guidance enabling him to make up an itinerary covering a particular section of country within Southern Railway territory. All the natural advantages existing at each of the points to which he is directed, or in their vicinity, are fully stated, and he is attracted to that section, believing it offers what he is in search of. He stops off at the nearest station and employs livery to take him through the region he desires to inspect. His interview

with the liveryman develops the fact that his objective point is say five miles, or ten miles, from the railway station. Accustomed to good roads where he came from, he reasons that he can make the trip comfortably, and cover the ten miles easily in an hour and a half, with a lively team. But the liveryman tells him that because the roads are in such bad condition it will take three hours. If it is in the rainy season, the road is washed out, intervening creeks are up and not fordable, and it will be necessary to make a long detour—perhaps a mile, or two miles, to reach a bridge and then a mile or two miles to double back on the other side of the creek. Or, he may be told that the old bridge is unsafe, or that it has been carried away by the recent flood, and he will be obliged to wait a day or two before the trip can be made at all. If it is in winter, a graphic description will be given him, of hardened ravines in the road, or of mire a foot deep in the bottoms to be crossed. Now, how does all that appeal to him? Perhaps he reflects that having come so far, he will go on to the bitter end, and he makes terms for the team and a driver. Owing to the bad road, which demands six hours for the trip instead of three hours, which strains the buggy or back and may break the harness or gearing, strains his stock and perhaps will cripple it; while two horses are necessary instead of one—because of the bad road and a hill or several hills of difficulty are to be overcome, the charge for the outfit and driver is twice as much as would have been charged for the same service over a good road. The bad road at the very beginning takes a heavy toll from the possible settler. Not altogether discouraged yet, he orders the team; and when it is before him the chances are that it will be a sorry spectacle; horses broken down, spavined, wind-broken, and lean; vehicle mud-painted, weather-beaten, wornout, and ready for the coming catastrophe. A mile or less from the town the terrors of the road begin; and if the prospector reaches his destination without one or more breakdowns, he is at least thankful. But by this time he has had enough of that section; his eyes have not been cheered by the landscape, they have been fixed on the bad road and watchful of the ruts. He has come with hope to the railroad station, and it dies on the road to the farm he might have bought. He is lost to that neighborhood. But besides the loss of a thrifty, useful and substantial settler and neighbor, there are consequences to follow. When he returns to his old home he paints a picture. He tells the story of his hardships and his disappointments. He tells of the poor farmhouses—good enough for such roads, but repelling to the eyes of thrift. That is an advertisement of the section he had visited; and all the effort and all the money expended previously in his neighborhood creating a sentiment and inspiring a movement to that section of bad roads are wasted, and not one from his neighborhood nor from any other community he can reach will listen to us or to any other who may again attempt to secure settlers for a section rich perhaps in possibilities but damned by its bad roads.

Take another example, that of the actual settler. Good soils, a fine climate, heavy yields of crops, excellent conditions for stock, have induced him to locate in a particular section. He succeeds as well as his neighbors, gathers good crops, and there are markets waiting for them. But the roads are impassable; he must wait;

and while he waits his product loses value, or is decaying and lost altogether; or the market declines; or all of these things occur together, and he is a loser instead of a gainer. The bad road did it. He ruminates over this condition; he finds that it costs too much to get his crops to the railroad; or that sometimes he cannot get them there at all until it is too late. He is a man of thrift, of intelligence, and he sells out and leaves that section for one not any better in natural advantages perhaps, but where the roads are good. That neighborhood loses a good citizen and neighbor; and is advertised abroad as an undesirable section. He has written to his old neighbors and warned them to keep away from it.

Another, and a most serious evil inflicted by bad roads wherever they exist is their prevention of educational progress. You find the fewest schools, the poorest school accommodation, the smallest attendance, in school districts cursed by bad roads. Every hardship imposed upon a pupil in going to and coming home from the school is an impediment thrown in his way. Into such a section comes a prospective settler. Back at his home he has a family of boys and girls of school age. He investigates school conditions and facilities; finds them deplorable or doubtful; and finds that his children must travel several miles over broken and often dangerous roads between home and school house.

He moves on; and buys a farm in a progressive section where good roads exist and school facilities are on the same plane.

Another case may be cited; where a family is established. The agricultural features are all right; the climate is inviting; the people are hospitable and agreeable; a good railroad town is only five or ten miles distant. The new settler came in the dry season, when even the worst roads may be traveled. The road leading from the station to the farm he has purchased is just then wearing its best face, though evidently it is a Jams face. In the rainy season, in midwinter, it is no road at all; it is a nightmare. The new settler's best team can haul only part of the load over it on some days, and on other days none at all. The wife, the daughters, with their faces against the dripping windows, watch the elements and the road. They have wanted to go to town, or to visit a neighbor some miles away, for days or for two weeks; but the bad road reminds them of some of Christian's experiences in Pilgrim's Progress; and they are women. The Sunday is lamentation day. No church, no Sunday school, no outing; nothing but dull monotony and disappointment. They can go nowhere; and nobody can come to them. In this case, the bad road is a trouble breeder; the family is in rebellion; there is neither peace nor happiness in that home, but discontent sits on the hearthstone. The settler moves out; and the neighborhood has one more advertiser—of its demerits.

There you have the negative side of the question: bad roads prevent the settlement of the section by the most desirable classes; and drive out those who have overlooked or been deceived by road conditions.

It is easy now to make our deductions, in dealing with the other side of the question. It is a pleasure as well as a relief to pass to the bright side of the subject.

Good roads more than anything else transform the rural district. They add the most pleasing feature to the landscape. They induce the building of good farm houses along their highways, well furnished and supplied with modern conveniences and the comforts of home. Fine horses and vehicles follow, for the firm, smooth road which leads past the farmstead to the city or town and through prosperous neighborhoods, tempts

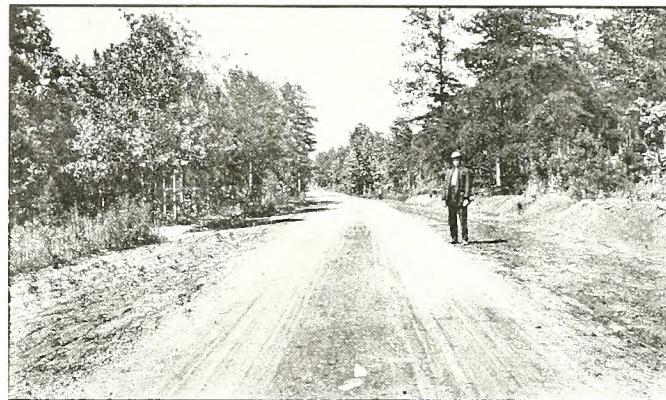
the farmer and inspires him with emulation when he sees well-groomed and wellbred roadsters and handsome equipages passing his door daily, in good weather or bad, with no risk of break or strain, even at a clipping gait.

Good roads, therefore, bring good stock; and with good horses and a good road communication between distant neighbors is easy; intercourse between communities is established; social enjoyment is complete.

Good roads greatly increase school attendance; therefore, better school buildings and more of them are demanded and are built along the safe and inviting highway.

Good roads enable the rural populations to regularly attend the country, village, or city churches. More and better churches are built in the rural districts along the good road; and these churches cement the community, elevate it, and add immensely to the social conditions.

Good roads, more than anything else, in rural districts, increase land values. They increase the demand for real estate. They make investments in land secure. They justify and encourage rural development. They draw families from the nearby congested cities or towns, and such people build handsome homes, adding



Tar Macadam Road at Greenville, S. C., Built by the United States Office of Public Roads.

to the attractions of the neighborhood.

Good roads shorten the distance, computed by time, between the farm and the railway, can be traversed at all times and in all seasons by heavy teams with full loads, facilitating the movement of crops to an incalculable extent and minimizing the cost of handling market products. The cost of living in the market town is reduced in proportion, and this becomes a factor in securing additions to its population.

Good roads carry more freight than bad roads to the railroad, increasing its revenue and thereby enabling it to give better facilities to that section. With good railway service towns expand and industries multiply, with a corresponding increase in the demand for outside labor.

Now, my personal experience with the desirable class of immigrants, during the many years of my service in promoting the settlement of such people is, invariably, that the new location must offer advantages sufficient to justify them in the breaking up of their homes, and the expense of moving into a strange region and there building anew. Not only are soils and climate demanded, but good railroad facilities, good markets, and good communication with neighboring sections and with a trading town. And they want still more than that: good schools and churches, and convenient access to them. The right classes have been accustomed

to them; and will seek only such locations as have them. Those who would select a region where conditions are stagnant because there is no civic pride and no disposition toward progress are few. Such districts are avoided by the very people they most need. On the other hand, the enterprising and progressive element searches out those localities where conditions are better than in his old environments. He may not even have contemplated a change of location; but learns from some source that a certain section in another part of the country has, in addition to natural advantages, enterprising people, efficient railway service, public improvements, a beautiful countryside, good turnpikes, delightful homes where contentment reigns, fine road stock, good schools and convenient churches. These are superlative inducements, and he contrasts them with the unfavorable conditions that surround him. He is a prospective settler; and when he drives over the course, the scene decides him. The good road has brought a good citizen—and it will keep him. The result has been indirect, but it is a result. And because

good roads create good conditions, afford better opportunities, increase the farmers' gains, conduce to comfort and add to social enjoyment, make intercourse between families and between farm and town, encourage homebuilding, promote education, and enhance land values, the influence of good roads in attracting immigration is greater than that of any other, yes, than all other local factors combined.

In closing, permit me—as a friend of the south and a well-wisher toward all its people—to advise every tax payer to support, to the fullest extent, any movement that will bring about an improvement of the public highways; to bear in mind that every dollar they expend, every effort they make, in behalf of good roads in their respective sections is an investment and not a donation; that the returns will be immediate and ample; that good roads builded by the fathers are rich inheritances transmitted to their children, and monuments to their wise forethought and their generous consideration of their posterity.

Dirt Roads

By DR. JOSEPH HYDE PRATT, State Geologist

When we stop to consider the number of miles of road in any county and compare this number with the small number representing the miles of specially surfaced road, we can readily see that it will be a great many years—perhaps, generations—before all, or even half, the public roads are surfaced with macadam, or sand-clay. For this reason it is very important that we should give very careful consideration and thought to the construction and maintenance of the dirt road.

When properly constructed, the dirt road can be kept in good condition throughout nearly the whole year, except, perhaps, during periods of severe freezes and thaws. At the present time we have very few earth roads but what can be improved, and usually the question of the improvement is not a very difficult one to solve. Fig. 1.



Fig. 1. Dirt road that could be improved 100 per cent. by use of split log drag

The old idea that anybody can build a dirt road is fast losing ground, and our people are beginning to realize that road construction, even of dirt roads, requires the services of men who have been trained in this line of work. As careful thought should be given

to the construction of dirt roads as is given to the hard-surfaced roads; and in those counties which rely on just the labor tax for the construction of their public roads a great advance can be made if this labor tax is utilized under the supervision of an experienced road engineer.

The location of any public road is the only permanent portion of the road; therefore, great care should be taken that when the road is once constructed there should be no question whatever regarding its reloca-

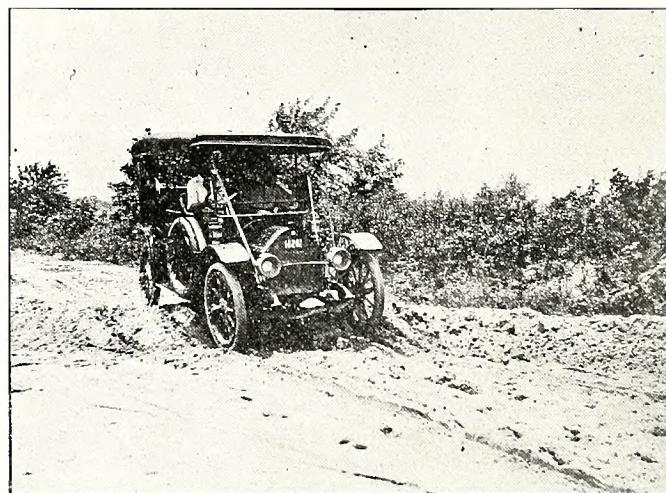


Fig. 2. Road with steep grade (average 10 per cent.) Travel made more difficult by uneven surface of road; large stones project above the road.

tion. In locating a road it should be done so as to permit of an easy grade—none over 4 1-3 per cent—and should be constructed so that it will readily shed the rainfall. How often we see a road going up a hill and down the other side, when, by building around the side of the hill, it could have been kept at an even grade, reaching the identical point within the same distance, or but a little greater.

If, in grading a road, we have any grades over 4 1-3 per cent, it will be necessary to construct across the

surface of the road a V-shaped surface ditch to turn the water off the surface of the road, for if this is not done the water will, with the grade over 4 1-3 per cent, have momentum enough to seriously gully the surface of the road. No matter how carefully these V-shaped ditches across the surface of a road are constructed, they are very inconvenient to travel, are hard on the wagons, and should be avoided wherever possible. They can be avoided if the grade is kept below 4 1-3 per cent. In fig. 2, is illustrated a steep grade on a road in Davidson county, N. C., which could readily be eliminated by relocation of the road. The surface of the road is uneven, and large rocks are projecting above the surface. "Thank-you-mams" have been made across the road to turn the water off the surface of the road, which add a great deal to the discomfort of travel over this road



Fig. 3. Surface ditch in dirt road for carrying water from one side to the other. These ditches should not be used, and the water should be carried under the surface by means of a culvert

The dirt road is more susceptible to damage by water than, of course, any of the specially surfaced roads; therefore, great care should be taken to work out an efficient system of drainage for the road. Water must be kept away from the road, and the rain which falls on the road must be permitted to run off as rapidly as possible, and by a very easy grade. It must not only be taken off the surface of the road as rapidly as possible, but also out of the side ditches. Care should be taken that these side ditches are not too steep, and that every opportunity is seized for turning the water out of the ditches into the adjoining fields.

Many of our country roads are bad because in their construction no arrangement was made for taking care of the water, and thus they are very muddy and filled with ruts and holes. Instead of the middle of the road being higher than the edges, so that the water can readily run off on each side, many of them are flat, or even concave, with the center of the road the lowest point. If the road has been constructed so that it is well crowned, with the slope about 1 in 20 from the center of the road to the side ditches, and these ditches have been graded so as to readily take care of the water, and yet not steep enough to cause them to cut deep gullies on the side of the road, and if the water is taken from these ditches at every available point so as to prevent seepage of water under the surface of the road, there should be little difficulty in keeping the road in good condition. Very often it is necessary to carry the water from one side of the road to the other; and when this is necessary, it should be carried under the surface of the road by means of either concrete, metal, or terra-

cotta culverts or pipe. The water should never be carried across the surface of the road, for it keeps the surface soft, is apt to flow down the surface of the road unless prevented by high rock, and is a great inconvenience to travel. Fig. 3 shows a surface ditch with lower side so high that a heavily loaded team would apt to be stalled. Wooden culverts should be avoided if possible and where necessary to use them they should be made of good timber and all planks securely nailed. They should be examined constantly so that they can be kept in good condition. The surface of the road should be kept as near flush with the surface of the culvert as possible. Fig. 4 is a poor form of culvert.

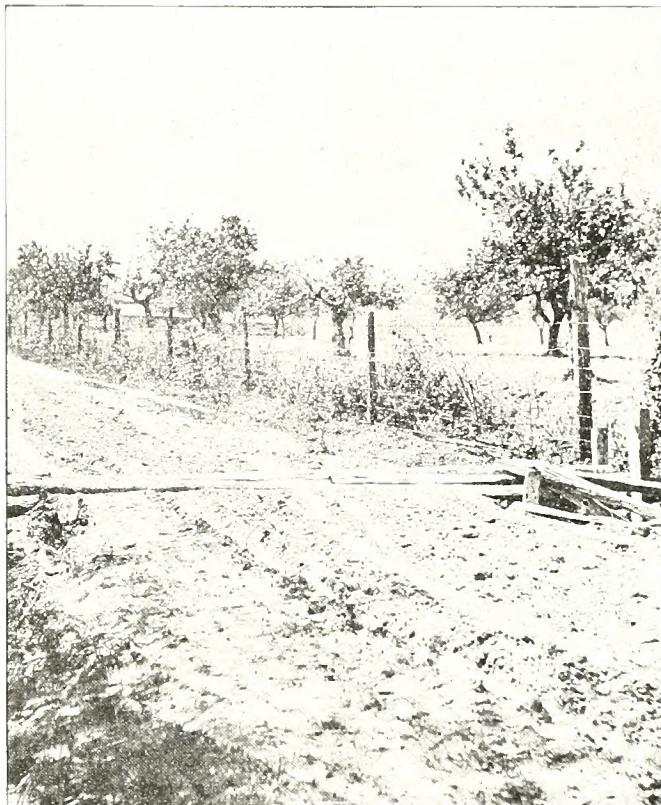


Fig. 4. A Craven County Culvert, Old Style, Regular Vehicle Smasher

After the system of drainage has been installed, provision should be made to keep it up, so that the drains and the culverts will not become stopped up.

The surface of a dirt road should be kept of dirt, and whenever any holes or ruts have developed in the road, they should not be filled up with stone, or brush, but with dirt, and with dirt as nearly as possible of the same character as the dirt composing the surface of the balance of the road. If, on the other hand, holes or ruts are filled with rock, gravel, or brush, the wearing effect will be uneven, and the wheels will begin to scoop and cut out holes just beyond or on the opposite side of the road from the hole filled up. If there are stumps or rocks in the road, they should all be removed, so that the dirt surface can be smoothed over and brought to an even slope from the center to the ditches. Fig. 5, represents a road that it is impossible to maintain properly on account of the stumps. After the road has been well constructed and the right slope and surface obtained, it can be kept in this condition very readily by judicious application of the split-log or King drag, Fig. 8. This simple road machine, if used regularly after a rain when the roadbed is wet, will smooth and shape up the road, so that as soon as it has dried out it will be firm and hard. The drag will fill up the ruts

and holes and will keep the dirt road in first-class condition, with hard surface, throughout nearly the whole year.

As moisture is very detrimental to a dirt road, the sun should be permitted to strike the surface of a dirt road as much as possible; and, therefore, care should

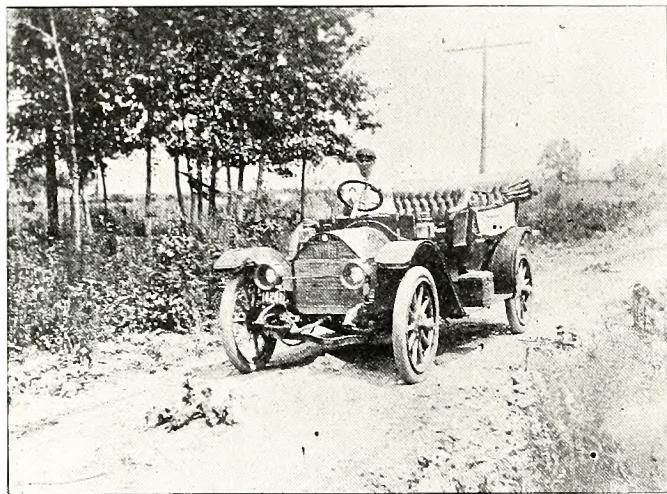


Fig. 5. A road where surface contains a great many stumps. Such a road cannot be maintained properly.

be taken not to have too much shade along a dirt road, and, where necessary, the trees should be cut away so that the whole surface of the road is exposed to the sun for at least several hours during the day. Shade is good for a macadam road, but bad for a dirt road.

In repairing a dirt road the same thought must be given as in the construction of the road, and, when cleaning out ditches, the material should not be thrown into the middle of the road or on any part of the surface of the road, but it should be thrown into the adjoining fields, for this material is usually composed largely of fine silt and vegetable material, which holds

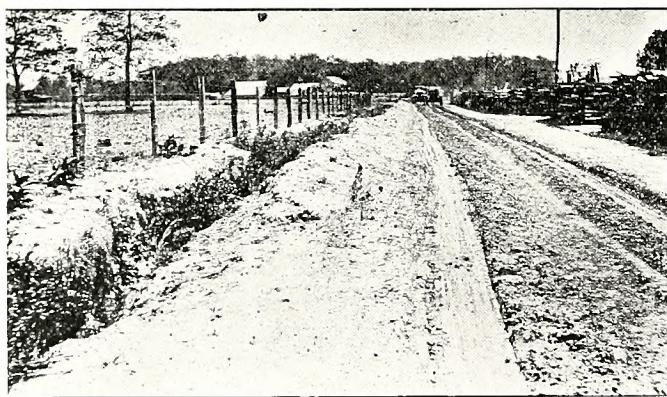


Fig. 6. Old way of throwing dirt from ditches on side of road preventing drainage from road into ditch. This scene is in Craven County.

moisture like a sponge and becomes very difficult to dry out, and is entirely different in character and consistency from the dirt surface of the road. How many times we have seen the dirt road repaired by this material being thrown up into the center or just beyond the edge of the ditch, thus preventing the surface water from flowing into the ditches, and often turning it down the road!

In the maintenance of our dirt roads they should be divided into sections, with a foreman or overseer in charge of each section, whose duties should be to go

over every mile of his section after every rain and at least every two weeks, and wherever he finds a portion of the road needing repair, he should have it done. After each heavy rain he should run a road drag over the road in order to bring it into shape and to fill up any ruts or holes that might have been started. We must bear in mind that roads will not maintain themselves, and that repairing a road simply once a year will not keep it in good condition.

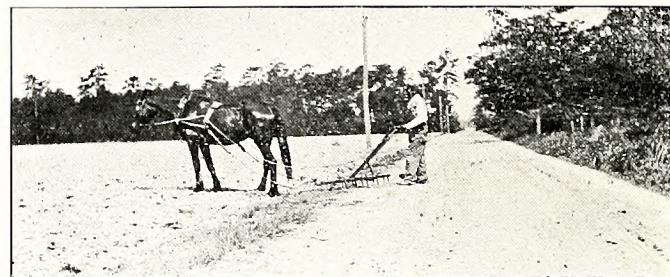


Fig. 7. Wayne county farmer using the public road for a turning place for cultivator, thereby damaging the road.

The cost of maintenance of the public road is often increased by the farmer using the road as a turning place when plowing, harrowing or cultivating their fields. County and township road commissioners should not permit this as the farm implements carry a certain amount of soil into the ditches and onto the road. Fig. 7, illustrates this use of the public road which should be prohibited.

In repairing a dirt road:

Don't fill up the holes and ruts in the dirt road with brush, with rocks on top, and a little dirt to cover the rocks; but fill up the hole with dirt of the same character as the balance of the road.

Don't throw all the refuse from the ditches into the middle of the road, thus softening the surface and destroying the solid, firm bed that you have obtained by previous work; but throw this material out on the opposite side of the ditch.

Don't leave the center of the road the lowest point; but make it the highest and give the surface of the road a slope of about 1 in 20 to the side ditch.

Don't carry the water across the surface of the road from one side to the other; but carry it by means of culverts underneath the road.

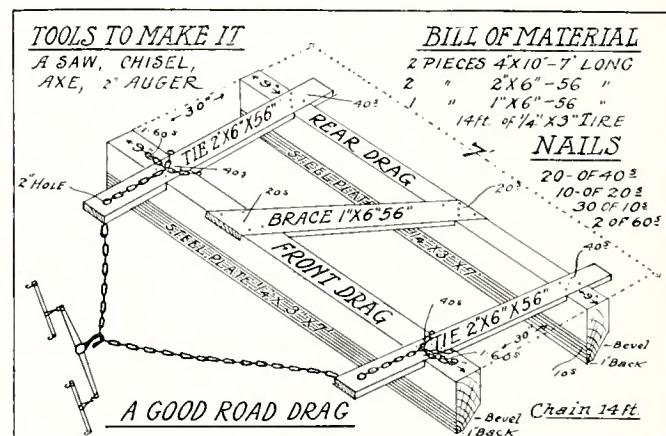
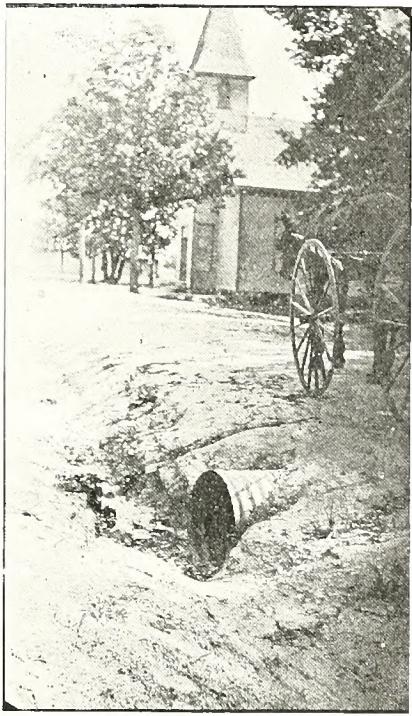


Fig. 8.

Don't have grades on your road over 4 1-3 per cent; for if you do it will be necessary to build V-shaped surface ditches or "Thank-you-mam's" across the road.

Don't, in working out the labor tax on the roads, try to make a holiday of it; but give an honest day's work

on the road. Let us eliminate what is often seen in those sections where the roads are maintained by the labor tax—ten or twelve men and an overseer, a little gray mule, a small plow, six dogs, three or four guns, and a few tools which often are not considered worth using at home. This road force is not only hard on the rabbits, but also hard on the roads.



North Carolina Culvert Company's Culvert at Nelson, Durham County, N. C.

Don't reject the split-log drag because it is a cheap road machine, but use it constantly, for it is the most efficient road machine that we can use in maintaining the dirt road. Fig. 8.

Annual Convention of the North Carolina Good Roads Association, to be Held at Winston-Salem, June 13 and 14, 1911.

The annual convention of the North Carolina Good Roads Association will be held at Winston-Salem, June 13 and 14. The past fiscal year of 1910-11 has perhaps been one of the most important in its life. The Association has been very active in trying to mold public opinion in favor of progressive road legislation, and, while no laws of state-wide importance were enacted by the General Assembly of 1911, a great many local bills for counties and townships were passed, which will undoubtedly enable the counties which take advantage of increased revenue from a special tax or bond issue to greatly increase their mileage of good roads. One of the principal undertakings of the North Carolina Good Roads Association during the past year has been the organization in the various counties of county associations. An arrangement was made by which the members of the county associations could become members of the state association and also receive a year's subscription to Southern Good Roads. As a result of this work there are now thirty-five county good roads associations in the following counties most of which are the direct result of the work of the state association: Anson, Buncombe, Burke, Carteret, Catawba, Chatham, Columbus, Craven, Cumberland, Duplin, Forsyth, Granville, Guilford, Halifax, Harnett, Johnson, Lee, Lenoir, Macon, Madison, Mecklenburg, Montgomery, Moore, Orange, Pender, Person, Perquimans, Randolph,

Richmond, Robeson, Rockingham, Union, Wake, Wayne, and Yadkin. Through these associations the doctrine of good roads has been spread far and wide throughout the state. In addition to the above a good roads association has been formed in Conrad Hill township, Davidson county, known as the Holly Grove Good Roads and Agricultural Association; also the Charlotte-Wilmington Highway Association, etc.

A large attendance from all these associations is expected at the annual convention and it is hoped that this meeting of the State Association will prove a well-spring of enthusiasm to the local organizations so that the various delegates and members will each go back to his particular locality with renewed determination and purposeful vigor to carry forward the effort to educate all of our people not only to a realization of the necessity for good roads, but to the crystallization of public opinion to the point of being willing to pay for them. A program is being prepared which will undoubtedly be full of interest to those attending, a variation from the regular program being a question box, reports from county Good Roads Association.

The past year's work of the North Carolina Good Roads Association has been very successful in the number of associations formed in the various counties with the consequent broadening of the activities and influence of the State Association through these county organizations; and in the large amount of literature distributed by the State Association in co-operation with the North Carolina Geological and Economic Survey. A circular relating to road drags has brought to the attention of a great many people the real value of this implement and educated them to the use of it. Circulars relating to certain suggested legislation for the creation of a State Highway Department, state engineering assistance to counties, use of convicts in public road construction, and state security for county road bonds were printed and widely distributed. The singular indifference, however, shown by the General Assembly of 1911 to all matters of state-wide importance is a matter of much regret, particularly with regard to road legislation, as more progressive legislation along this line has been markedly indicated by the press as expressing the opinion and desire of the people of the state and by the large number of requests that are constantly being received by the State Geologist for engineering assistance and advice with regard to the location, construction and maintenance of roads.

The North Carolina Good Roads Association has done everything in its power to show the people the necessity for good roads and the remedy for bad roads. It is now the task of this association to continue this work among the weaker counties, in the hopes of gradually bringing them to the point of not only desiring good roads, but of being willing to pay for them. In this work the stronger counties, stronger because of their progress in well constructed roads, not only serve as examples of what can be done, but in many instances these counties have shown a disposition to lend a helping hand to pull their weaker neighbors out of the mud.

The headquarters of the association will be at the Hotel Zinzendorf where special rates have been arranged for members, delegates and their friends. Delegates to the meetings of the North Carolina Good Roads Association include all members of the state association, county associations, county and road commissioners of all the counties of the state, mayors of municipalities, and delegates at large appointed by chairman of boards of county commissioners, mayors of towns and cities, and presidents of local clubs and business associations. A most cordial invitation is extended to all who are interested in the promotion of good roads to attend

The Great Central Highway

By COL. ROBT. M. PHILLIPS, Associate Editor Greensboro, (N. C.) Daily News

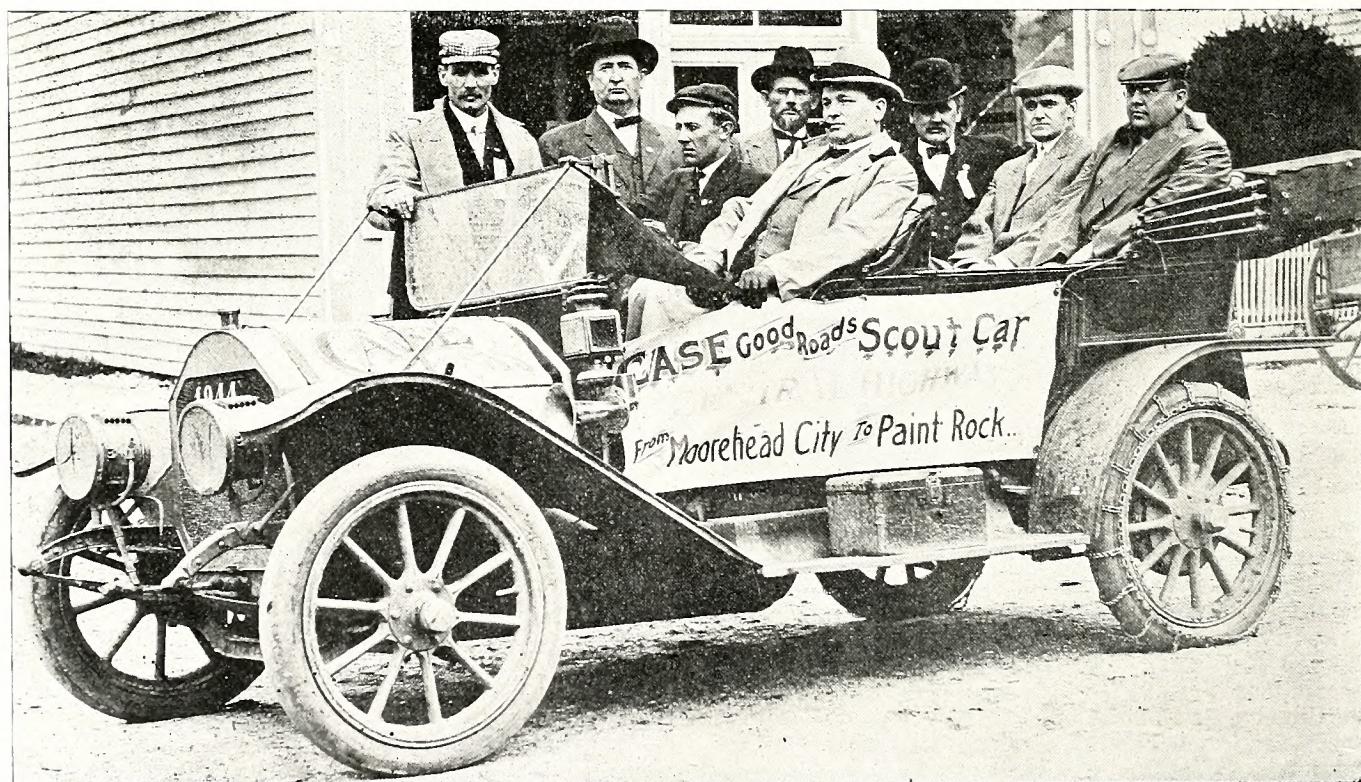
I am asked the question: What does the proposed Central Highway mean to the state of North Carolina? Would that I had the power of prophetic vision to accurately measure its potentialities, and the ability to sweep aside the veil which the future has hung just before our eyes. We would see a new commonwealth. It would require that ability to correctly answer the question. After spending one entire week in going over the route from Beaufort harbor to Raleigh, and studying the country to be traversed and the possibilities among the people to be served, I am convinced that no one movement has ever before been inaugurated that has such an important bearing upon the future industrial and agricultural life of the state.

There are in this Central Highway movement the possibilities of a complete revolution in the state's progress. The people have caught the inspiration in the eastern counties, and are getting ready to grasp the opportunity. Heretofore, in that section the automobile owners were the sole leaders in good roads work with an occasional farmer to second the motion. But the movement has gained a new impulse and a new courage. The farmers are rising to an appreciation of hard roads over which to carry their products to market, over which their children can go to school, over which they themselves can travel to church and to visit their neighbors. They want to get rid of the much exploited sand and mud tax. They see in the Central Highway help in that direction.

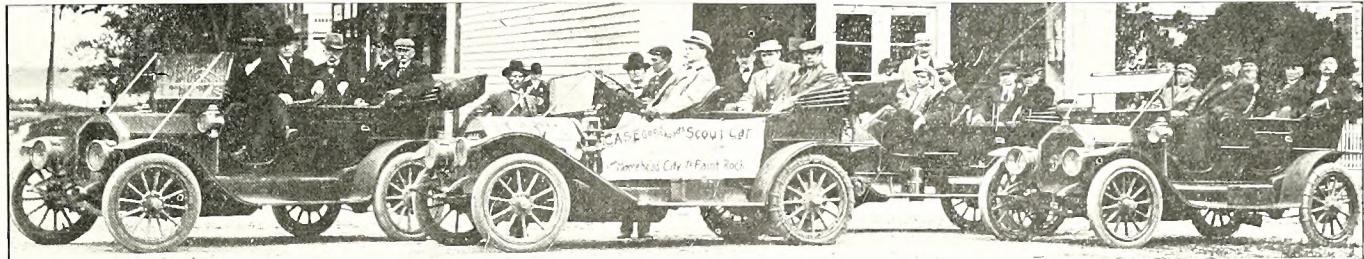
The benefits the Central Highway will bring to the seaside resorts—Beaufort and Morehead City—no man can foretell with accuracy. First, I may mention the

pleasure seeker, the fisherman and the gunner. No place on the Atlantic coast surpasses the waters about the Beaufort inlet and extending many miles up and down the coast, for delightful sailing. The natural facilities for pleasure at the seaside are all there. A vast expanse of sound waters, where it is safe for large or small pleasure craft, sweeps away in almost every direction from the jutting points of land on which the beautiful little cities and the hotels are located. The pure fun of sailing, breathing the invigorating salt air, and delightful sporting in the surf, aside, those same waters constitute the angler's paradise. Fishing there is a specialty, and that means catching fish when you wish the sport, and at almost all seasons. In the winter months duck shooting is plentiful, while wild geese are also there in great numbers. With good hotels these attractions have already created a demand for the highway; and the people of the coast section are going to build their link in the great chain.

It is of vast importance that the resources of the coast and sound country be speedily developed, that the immediate section may keep even pace with the rest of the state and with the nation. Only a short distance out from the coast there are some splendid farms and thousands of acres undeveloped. The great inland waterway extends through this section, and only good roads are needed to complete transportation facilities—water, rail and dirt. The natural order of things is perfect, and man is supplying the artificial. From the point, or points, where the Central Highway strikes the sound, branch lines of good roads will soon radiate to points back in the farming and trucking sections, thus



The Central Highway's Case Good Roads Scout Car. On the car are Dr. Joseph Hyde Pratt, State Geologist, H. B. Varner, Chairman, Drs. A. Cheatham, J. M. Templeton, Messrs. J. A. Wellons, G. D. Canfield, Trustees, Mr. R. M. Phillips, Greensboro Daily News, Mr. H. S. Holcomb, Chauffeur. The Case Automobile is one of the very best made. This machine had already before starting on this trip run over twenty thousand miles.



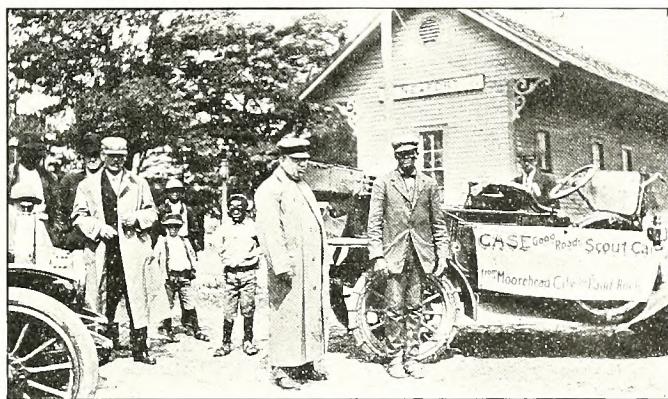
Central Highway Scout Party on arrival at Morehead City, N. C., May 8th., 1911

opening up an inviting prospect to settlers and home-seekers. Probably no county to be traversed by the Central Highway has more to hope for, more to inspire it in the work of immediate construction, than Carteret county.

The route from Morehead City to New Bern, is, for the greater part of the way, through a sparsely settled country. Thousands of acres of untraced virgin lands

where good country roads abound and where there is comfort and pleasure in automobiling, fishing and hunting, he leaves the Pullman and takes to the freedom of outdoor life. The Central Highway completed will mean a tremendous increase in tourist travel, which in turn will mean greater prosperity for the resort towns and the territory embraced in the hunting and fishing region of the Carteret coast, the Craven jungles and lakes and rivers.

Craven will build perhaps the longest stretch of the Central Highway of any county of the nineteen or twenty it will go through, nearly sixty miles, and is not complaining about it. The people of that county expect to share its benefits proportionately, and they will not be disappointed. About every acre of land along the route in Craven is susceptible of great development. Already some of the best farms in the state are on the route, and there are other thousands of acres just as fertile. Some attention is already given to drainage, and these two—drainage of farm lands and good roads—will make Craven one of the richest coun-



Scout Car party at Newport on the Central Highway, interviewing "Trotting Jim," a negro who thinks he is a mule. "Trotting Jim" is the discovery of Mr. R. M. Phillips of the Greensboro Daily News.

spread for miles on both sides of the route. There are also streams and swamps that abound in fish and game—a pointer for sportsmen. In Craven, as we near New Bern, we find some finely developed farms in a highly successful state of production. These are demonstrative of the possibilities of the soil in that section. The Central Highway will be the means of showing these possibilities to thousands who otherwise would never see them. It will also be an inducement—the real turning point—when a homeseeker wants to buy. It is a well settled fact that citizens such as we want in North Carolina, are not going to settle in unprogressive communities. No progressive community will tolerate bad roads.

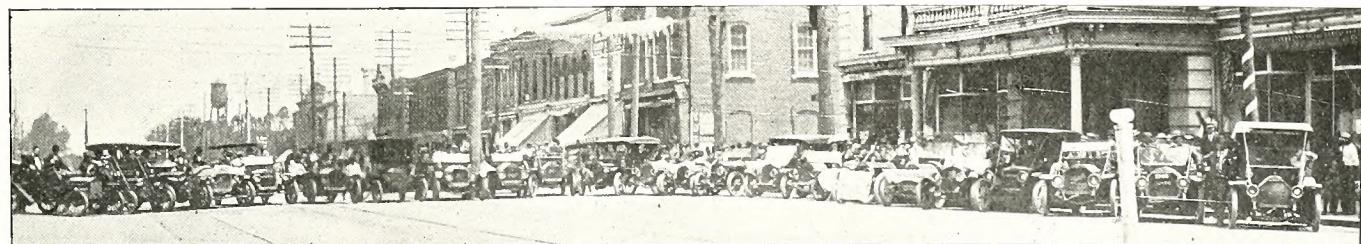
In all of the sound and tidewater country the tourist question is an important one; and the rural dweller and farmer realize this as much as the inn keeper. We have reached an era when the tourist has had a surfeit of stuffy Pullman car travel. When he reaches a sec-



Mr. C. G. Blades' Automobile plowing its way through a Craven County Swamp road en route to his home at Laurel, Del.

ties in the state. Released from the sand and mud tax, and draining out the poosins that sour the soil, Craven lands cannot escape the scrutiny and the choice of investors who seek for something good under southern skies where the growing seasons are long and the climate mild.

In Lenoir and Wayne counties the inducements are just as great and the benefits just as sure. These



Central Highway Scout Party on arrival at Goldsboro, N. C., May 11th, which was escorted by twenty-one automobiles from LaGrange, to Goldsboro. This was the biggest demonstration on the eastern portion of the Central Highway. Wayne County will soon vote a \$200,000 bond issue for good roads.

counties will make up in greater facilities for their own pleasure, the marketing of their crops and the increase of farming forces, as much as they will miss of the tourist travel as compared with the tidewater and coast towns. The same is true of Johnston and Wake. The Central Highway has a different meaning—in a sense—for the different sections it is to traverse. For the resort sections it means enlarged tourist travel, first, and in the strictly farming sections it means greater transportation capacity at far less expense. For all sections it means progress and more rapid growth and development. It means that all along the route traversed the number of cozy and comfortable homes will soon be doubled, that there will be more and better school houses and a superior order of intelligence and a higher type of citizenship. The leaders in the movement realize that these things are true, and they have therein a motive and an incentive higher and more worthy than the mere enhancement of material values and the creation of wealth that is valueless without character.

In pushing the Central Highway movement at this time I believe the psychological moment has been seized. Public service and comfort and progress demands greater facilities. The Central Highway has a definite mission that is two-fold. It means greater service to given points, but not the least in efficacious results will be the great object lesson it will furnish to adjacent counties. It is a response to the spirit of the times. When men are beginning to fly through the air as fast as trains can run on steel rails, it is out of harmony and behind the times for the toiling farmer to wear his life away and that of his teams tugging through deep sand beds and mud holes to get his produce to market. When the material is lying alongside the roadways in plentiful quantities to make them good and do it cheaply, it is a wasteful policy to continue struggling over and through bad roads. The building of the Central Highway means that such policy is about to be abandoned.

From Beaufort and Morehead City to Raleigh the Central Highway scout party literally ran through a flame of enthusiasm for the highway and left behind it an expressed determination that it shall be built. When once it is done an impetus will be given to good roads building that will sweep the state. It will prove to the people that they are not too poor to build roads, and that the quickest way to escape poverty and penury is to build them. And they will build them.

The building of the Central Highway means that, following an era of railroad construction throughout the state, an era of manufacturing development in which we have seen great plants erected with millions invested; also an era of great educational awakening in which schools have expanded and great colleges have sprung up; an era in which newspapers have grown to metropolitan proportions; an era in which better farming has received great impetus, the greatest thing lacking to complete the opportunities for the splendid achievements that are almost within our grasp, must come—good roads. It means that country life will be more attractive to the young men and women, that more rural homes will be built, that farm life will be a pleasant and profitable business rather than forced and tiresome drudgery. Country homes will have the comforts of those in cities without the discomforts of the crowds, the smoke and the dust and din that distracts. The multiplication of rural mail routes and of telephones will bring the world to the front gate, and all that is wanted of it into the homes.

Kings Mountain township, Cleveland county, N. C., has voted bonds for \$25,000 to build a system of sand-clay roads.

A Great Highway in the West.

The greatest good roads project ever undertaken in the west now is under way—a scenic highway linking Yellowstone National Park and Glacier National Park, under federal, state and county control. The Hamilton, Mont., chamber of commerce is the originator and primary promoter of that idea.

It is the plan of that commercial body, after receiving the approval of the commissioners of Gallatin, Madison, Beaverhead, Ravalli, Missoula, Flathead and Teton counties, of Mont., putting the matter up to the state and to the United States departments of war and of the interior.

The route suggested between the great scenic park highway of America is 450 miles in length and through a territory which, while mountainous, is said to present few difficult engineering problems. In fact the road is already well defined and needs only to be unite and rebuilt, not entirely, but in several instances.

The route appears on the map somewhat like a half crescent, which is the most direct line possible in this part of Montana. The Yellowstone end begins in the western entrance, going west by north, past numerous lakes, through the southern panhandle of Gallatin county and over to Monida, in Madison county, where it connects with the Oregon Short Line. Soon after leaving Monida it enters Beaverhead county, paralleling Beaverhead creek to Dillon. From Dillon its general direction is northwest, passing through Jackson, Hot Springs and Wisdom, and swinging over the divide into Ravalli county, meeting the east fork of the Bitter Root Valley. Entering Missoula county, it continues north, through the city of Missoula and the towns of St. Ignatius and Ronan. At the foot of Flathead Lake, in Flathead county, it enters Polson, passing around the west side of the lake, through Dalton and on to Kalispell and Columbia Falls, then northeast to Belton, the entrance to the Glacier National Park.

It passes through six counties and approximately forty towns. It connects four railroads, the Oregon Short Line, the Northern Pacific, the Great Northern and Puget Sound.

The first and foremost reason for the construction of such a highway is the connection it will make between the two wonderful parks. It will afford closer co-operation in the management thereof. It will be as great a gift to the American people as the parks themselves, for in all America there is no road with greater scenic attractions, and such facilities of transportation and capability of maintenance. It traverses a territory of changing scenery, part of which so long ago impressed Lewis and Clark. With the rapidly increasing attendance at the Yellowstone National Park and the opening of the Glacier Park there will be an urgent demand for connection between the two, and at present there is not even a direct railroad line, but with a federal highway similar to those in the parks and with transportation companies operating motor and other lines, tourists would be afforded an opportunity of seeing both parks as well as the great country between.

Coin Harvey, the man whose little book on the nation's monetary system back in the campaign of 1896 made such a stir, has become a good roads booster and promises to be of much more real value to the people of the United States in that role than he was when he was wasting his energies boosting free silver at the ratio of 16 to 1. His latest road project is the "Great White Way," a boulevard from Muskogee, Okla., to Mount Nebo, Ark. Nearly \$10,000 has been pledged for the work and it is planned to build the road in one day. It is 90 miles long.



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VOL. III.

JUNE, 1911.

No. 6.

MAINTENANCE OF PUBLIC ROADS.

The American people are called the most wasteful people on the face of the earth and their wastefulness is most strikingly illustrated in connection with the maintenance of their public roads. We are so taken up with the present that we have little or no thought for the future, with the result that what we build today we permit to be destroyed tomorrow.

Millions of dollars are being spent each year for the construction of public roads and plans are made to raise many other millions for the same purpose, but in most of the states no provision has thus far been made to raise funds with which to adequately maintain the road after it has been constructed. Roads will not maintain themselves no matter what materials are used in their construction, and a "good road gone bad" is perhaps a greater hardship to a community than the original bad road.

Scattered over the country there are thousands of miles of "good roads gone bad" and yet we have not learned the lesson of road maintenance.

"A stitch in time saves nine" is very applicable in road maintenance for a little work done at the right time will prevent heavy expense and often save a road, while the delay in this repair work means nearly always a bad road. A road cannot be adequately maintained by simply going over it once a year, it must be inspected constantly and any repairs needed should be made at once.

The present condition of the public roads that have been built at a cost of \$3,500 to \$12,500 per mile is a

disgrace to our civilization. Some of these roads have been built 5 to 10 years without any attempt whatever having been made to repair them and keep them in good condition.

In one of the smaller states sufficient funds were appropriated to build a system of good roads throughout the state, but at the end of a certain number of years, when they had nearly completed the system of roads, they found to their surprise that the first roads which they had built had worn out and were bad. They realized they never would get a system of good roads for the state by the method that they were following, for they had made no provision for the upkeep or maintenance of their roads. By adopting a plan of maintenance of roads as they were built that state is now obtaining a very satisfactory system of good roads.

It is necessary that every state and county should have a maintenance fund to use in the repair of the roads they build if they expect to ever attain a system of good roads.

As we raise money for road construction, raise another amount for road maintenance.

Do not forget that roads will not maintain themselves.

* * *

DIRT ROADS.

A very timely article on Dirt Roads appears in this issue of Southern Good Roads and relates to a subject that has not received the attention it should from good roads advocates.

"We cannot afford good roads" is a complaint too often heard. It is used altogether too constantly as an excuse for not having good roads. It may be true in some instances in regard to hard surfaced roads, but it is not true in any case when applied to Dirt Roads. Any community can have good dirt roads even if the revenue raised in the community for road work is simply a labor tax, for the utilization of this labor is absolutely under the control of the commissioners and they have the right to call out the men subject to this labor tax at any time.

In many communities there is a very large proportion of the labor wasted, which if rightly expended would better the roads very decidedly and would after a few years give to the community a system of first class dirt roads. Even where a revenue for road work is raised by a direct tax, a great deal of the money is wasted. Last year a number of states wasted from \$400,000 to \$600,000 in their road work, due to incompetent men who had charge of the work; to trying to do a large amount of road work and doing it badly, instead of doing a smaller amount and doing it thoroughly and practically; to attempting to build a road to satisfy certain interests instead of building the road to the best interest of the community; and to some politicians who have tried to make political capital out of the location and maintenance of certain roads.

These causes for the waste of such large sums of money in road work can easily be eliminated if our people make up their minds that they want them re-

moved, and when removed, we should be able to have good dirt roads in a very short time.

The ratio of dirt roads to hard surfaced roads is still in many of the southern states as 8 to 1 and their numerical importance demands more adequate attention from those who have been clothed with authority to supervise their construction and maintenance. Give the Dirt Road a square deal.

* * *

NATIONAL AID.

Much has been said of recent years concerning national aid for the building of highways and it is apparent that much more will be said, because the idea is a good one and is growing in popular favor. In this issue of Southern Good Roads is published the good roads bill recently introduced in Congress by Senator Claude A. Swanson, of Virginia. Senator Bankhead of Alabama, has introduced a bill looking to the same end and there have been a dozen, or more, introduced during the past year. So far, the bills have never seen the light of day, being stifled in committee, or sidetracked in some way. Now that such strong men as Swanson and Bankhead are getting in behind the movement, we look for results. Senator Swanson is an experienced legislator and Senator Bankhead is hardly less accustomed to the deviousness and turnings of national legislation, and the two of them ought to be able to bring things to a head. We hope that Swanson will be able to force a vote on his bill, for we, in common with hundreds of thousands of other good citizens, want to see just how our representatives stand on the good roads question. All of them boast the good roads movement on the stump and all of them are ready at a moment's notice to take a stellar role in any sort of a good roads gathering, but it does not appear that they carry their good roads sentiments with them into the national congress.

The government has appropriated for this fiscal year \$188,815,323.52 for the navy; \$257,829,192.62 for the army; \$23,825,342 for rivers and harbors; \$23,000,000 for public buildings. For good roads, infinitely more important than a navy, a standing army, rivers and harbors, or all of the public buildings in the land, absolutely nothing. From present indications it is apparent that even larger sums will be spent in deepening harbors, widening and making navigable unimportant streams in all parts of the nation and we do not object to these expenditures. They benefit some of the people and are perfectly legitimate expenditures. Good roads mean a thousand times more to the people—all of the people from the humblest to the highest—than do magnificent public buildings, deep waterways, awe-inspiring armies and magnificent navies; yet, we spend billions for these and not one cent for roads.

The common people of Uncle Sam's domain outnumber the classes ten to one. Beneficial legislation should be so directed as to distribute fairly favors and benefits among all of the people, but it is not so. Less than a tenth of our people live where water transportation facilities mean much to them and comparatively few

are directly benefitted by magnificent public buildings, but all are affected directly and vitally by the bad roads that prevail throughout the nation. Strange that the greatest need of our people, that which most vitally affects their happiness and prosperity, should receive so little attention at the hands of the people's chosen representatives.

The national government recognizes the value of good roads and realizes also its responsibility for them and this is shown by the government's road-building activity in our recently acquired territories. In the Philippine Islands the United States has spent \$3,000,000 in road-building. In Porto Rico, for the use of the ignorant black native and his ox cart, \$2,000,000 has been spent. In the Panama Canal Zone, \$1,459,073.53 has been expended and yet other millions will have been poured out for roads along the Big Ditch before it is completed. At home, Uncle Sam has not spent a penny.

If the government can build good roads in the Philippines, Porto Rico and in Panama without violence to the constitution and without hurt to any established principle of government, the government can spend money in building post roads in the United States. Let us hope that our progressive representatives in the national congress will turn their attention to home things and home people and do some legislating in the interests of the great mass of the plain people who care not for great waterways, gorgeous public buildings to gratify municipal vanity and imperial fleets and armies.

Better Roads for Missouri.

As a friend of road improvement throughout the state, and in pursuance of his policy that no backward step shall be taken, Gov. Hadley has vetoed a bill making the appointment of a county highway engineer optional instead of compulsory with county courts. The bill was passed in the old do-nothing and spend-nothing spirit that is responsible for neglect of the public highways, and which is one of the most costly mistakes in carrying on American affairs. Gov. Hadley has pushed the subject of good roads since entering public life and misses no opportunity to set forth the advantages that will result from wise expenditures upon them. Missouri has 110,000 miles of roads, of which less than 4 per cent has been improved with macadam, rock or gravel. Over bad roads the cost of transportation is 25 cents a mile while on an improved road the cost is 8 cents a mile or less. If this money had to be paid out visibly there would be a rush for road betterment. But the leak is not fully realized.—St. Louis (Mo.) Globe-Democrat.

An officer of the Ohio Good Roads federation expresses the situation tersely in the following words: "The cry for good roads in Ohio, once a feeble wail, is now taking on the proportions of a roar. All interests are beginning to see that Ohio must join the procession of modern states and improve its highways in order to boost its agricultural, bring down the cost of living in the cities and give the farmer a chance to market his goods when the time is ripe and not be compelled, because of mud holes, to pass up good prices and wait for weather that will dry water soaked highways."

General T. Coleman DuPont's Delaware Highway.

General T. Coleman DuPont, a millionaire powder manufacturer, of Delaware, has attracted no little attention to himself by the announcement that he would build a great boulevard through his state, running the entire length of the state from north to south. Philanthropists have given millions for schools for hospitals and for libraries, but General DuPont is the first to give a road.

Mention of this remarkable gift was made in Southern Good Roads recently, but an extended account of the undertaking was, at that time, impossible. The great undertaking and his report is reviewed by the Virginian-Pilot as follows:

The boulevard will be 110 miles long. It will extend from the northern boundary to the southern boundary of the state, with a right of way of not less than 100 feet and not over 200 feet. The authority of the state legislature has been received, so that every step taken may be in accordance with the law; and, although this great highway is to be deeded absolutely to the state when completed, it has been the wish of General DuPont that a commission appointed by the governor should select the route, determine the character of the highway and the construction material to be used. The commission has been appointed and three surveying parties have been detailed to survey the various possible routes of the boulevard. In order to carry out the plan the commission has been given by the state the right to condemn land needed for the right of way. The final route will be determined by the results of the survey. To some extent it will be influenced by the desire of communities or individuals to have the boulevard pass in their vicinity, as expressed in their readiness to co-operate in arranging for the right of way. In one stretch of 15 miles every foot of right of way has been readily given by the landowners, while in another stretch of 12 miles only three miles has so far been given. Other conditions, such as the distance from the larger towns by which the boulevard should pass and the deviation that should be made toward cities somewhat out of the direct route, will be taken up by this commission, so that the final route may be the best available. When the route has been decided upon the work of construction will begin immediately.

The magnitude of the gift of a roadway to a state will be unique in American history. The construction will be of stone, gravel, slag, asphalt or such other road-building materials as shall be most available and deemed by expert highway engineers best suited to conditions as they may be found to exist at various points along the route. The construction will follow the best practice of road engineering and construction as to drainage, culverts, etc. It is intended to have suitable space for tree planting, sidewalks and beautifying the right of way. The portion of the boulevard to be devoted to the roadway and deeded to the state is to be 30 feet wide. The remainder of the right of way will be available for an electric railway line, underground pipes and conduits for the transportation of oil, gas, water, steam or any other purpose for which it can be legally used, provided, always, that such use is not detrimental to the highway for vehicular travel. It is proposed to establish stations at about every 10 miles, at which information of any kind desired may be obtained regarding the locality and at which supplies for automobiles, teams, etc., may be obtained.

One plan is to have a 12-foot roadway at each side of the boulevard, with a sidewalk and trees on the outer edge of each roadway, an electric line on the inner side of each roadway, and a walk with two rows of trees

forming the middle of the boulevard between the two electric trolley lines.

Personally, General DuPont does not think that the boulevard should go directly through any of the principal towns, because it would frequently be subject to the disadvantages of sharp turns, and it is probable that in many cases the way would be too congested for a boulevard. It is also possible that contention might arise between the authorities of the town and state. For these reasons he believes it would be preferable for the road to be at least half a mile from the town which it is to pass, with a branch road to extend from the town to the boulevard. It is estimated that the cost of the boulevard will reach \$2,000,000. When completed, the road will be deeded to the state and thereafter maintained by it. It is estimated that the cost of maintenance will be less than 4 per cent. per annum of the cost



Section of newly graded road in Craven county, near New Bern, N. C.

of construction. The enviable position of Delaware in having a citizen who has the will and the means to provide such a monument to civic pride is attracting the attention of the whole country.

More Iniquitous Than the Tariff.

When a good democrat, and a Georgia democrat at that, can be brought to declare that anything on earth is more iniquitous than the much hated high tariff, one can rest assured that the particular thing he is talking about is really steeped in iniquity and is a menace to the welfare and happiness of the people. Recently a distinguished Georgian put this stigma on bad roads and while there are many who will not agree with him as to the iniquity of the tariff, few will quarrel with him for his roads sentiments. A special from Washington, Ga., tells the story.

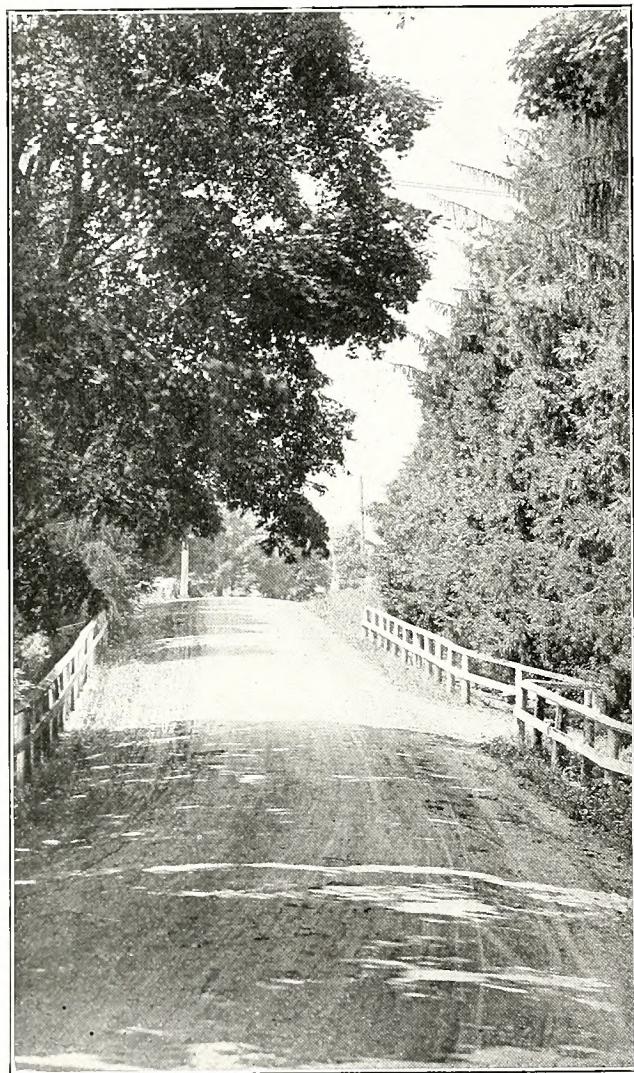
"More iniquitous than the tariff of the republican party upon the people of the United States is the tax of bad roads upon the people of the country." At least, this is the view of the matter held by Judge W. F. Eve, of Augusta, who is known as the pioneer builder of good roads in Georgia, which was expressed before the second monthly meeting of the Wilkes County Good Roads Association at the court house in Washington Monday afternoon.

Judge Eve spoke from a rich store of facts which had been gleaned during his 30 years service as commissioner of roads and revenue of Richmond county. He declared that the farmers of Georgia were made prisoners, commercially and socially, by the inaccessibility of the farms due to bad roads. He believed that good roads would solve the problem of diversification on the farms in making it possible for truck farming and then quick marketing of perishable products which are now made unprofitable.

The Good Roads Victory in Iredell County

By MR. H. P. DEATON, Editor Mooresville (N. C.) Enterprise

It seems that a great many people of the state of North Carolina were somewhat surprised that the county of Iredell should vote upon herself bonds to the amount of \$400,000 for road improvements, but those who are acquainted with the progressive spirit of the good people of this section, know that they are ever undaunted, and they entered upon the proposition with a determination of throwing off the shackles that bound them to the old fashioned way of travel up one hill and down another, wearing away their lives



State Road Near Peekskill, New York, Treated With Standard Asphalt Road Oil

and depreciating their stock by hard pulls through mud, grades and deep ruts. In other words, the rural citizenship is of that progressive type who believe in being merciful to their stock and leaving a legacy to their posterity that will be enduring and as great a blessing as when Moses led the children of Israel to the promised land out of the pest-ridden land of Egypt. The fight was made on a plain, everyday business proposition, and the arguments put up for the road improvements were conducted on the same plane as you would argue to a man the benefits derived from the building and loan association. For instance, the total

taxable property of Iredell county under the old assessment was more than \$10,000,000. The total road taxes from that assessment at 23 1-3 on the \$100, gave us in round numbers \$27,500. To borrow \$400,000 for forty years at 5 per cent. would mean an outlay in interest each year of \$20,000. Now take the whole amount of \$27,500 and set aside \$20,000 for interest, \$2,500 for road maintenance, and \$5,000 as a sinking fund, each year, and lend the \$5,000 out at 6 per cent compound interest. If you will take the time to count up the accrued interest on the \$5,000 loaned out each year for a period of thirty-one years, you will find that with the \$5,000 sinking fund and the interest we will have an accumulation of \$419,008.38, and nine years' savings on our bonds. Interest has or can be paid, bonds can be cancelled and we will have a balance of \$19,000 to be added to the care and keep of our highways. This is based on the old rate of taxation. In the bill adopted by the people of Iredell on the 9th of May, it provides that the road tax cannot be levied for more than 25 cents on the \$100 and 75 cents on the poll. This latter clause does away with the old system of swearing in hands to be worked on the roads, and substitutes hired labor. Under the old law in this county, the board of county commissioners had power to make the road tax almost anything they desired, to the limit of \$1.00 on the \$100 provided it required that much for the maintenance of the chain gang. Men of large investments were interested in the adoption of the new law for the reason that it specifies the amount of road taxes to be assessed, without the fear that the levy would be raised indiscriminately. It was shown by the returns that there are two large towns in the county of 16 townships, and outside of the towns of Mooresville and Statesville, both of which gave large majorities, the bond issue carried in the rural districts by a majority of 251 votes, and only five townships in the county voted against the measure. The total majority of the county for the bond issue was 1248. In south Iredell good roads have been the theme and strong point of the farmers for years, and when the bond issue for the county was agreed upon, the people of three or four of the lower townships were in mass meeting preparing to withdraw from the county and create a road district independent of the county, and vote upon the issuance of at least \$100,000 bond for roads. It will be readily seen by all readers of Southern Good Roads, that although we are paying interest on \$400,000 for thirty-one years, yet we will have enjoyed the benefits of the good roads for at least thirty years. It is based on the same principle as building a home with rent money. With this issue of \$400,000 it has been calculated that we can secure from 150 to 250 miles of good roads in the county, provided the proper engineering can be done to make sand clay roads in sections where grading will not make the cost too burdensome. Iredell is a live wire when it comes to doing things, and the progressive steps she has taken in the matter of good roads places her in the front ranks of all the southern section, and is a hobby of your humble servant, who agitated a bond issue on the same line in 1903, above. It is better, however, that the state supervision should extend to all the public roads except those in during the life of Hon. Augustus Leazer and Dr. J. R. McLellaud, who prepared a bill and secured its pas-

sage for an issue of \$250,000. The election was never called by our commissioners. The old permit of 1903 died by limitation, and sentiment being so strong for good roads in this end of the county that the question was again revived and as a result the above chronicle relates it.

Senator Swanson's Good Roads Bill.

Senator Claude A. Swanson, the brilliant junior senator from Virginia, has introduced in the senate of the United States a bill of much merit. He is an enthusiastic advocate of national aid in highway building and with his long legislative experience he ought to be able to force the senate to a consideration of his measure. He served in the lower branch of congress ten or twelve years, resigning to accept the governorship, and, though practically a new-comer in the senate, he is not without influence. The full text of his bill is as follows:

That the director of the office of public roads of the United States Department of Agriculture is hereby authorized and directed, under the general supervision of the Secretary of Agriculture, to carry out the provisions of this act as hereinafter set forth, and he is authorized to employ such engineering and other assistance as may be necessary, and the expense thereof shall be paid from the appropriation hereinafter made.

See. 2. That upon application of said director by the legislature of any state, or such officer as the legislature may designate, requesting national aid in the improvement of any post road or rural delivery route, and setting forth that such road is a post road or rural delivery route; that it is a main traveled highway; that its improvement would be of great benefit to the state; that funds will be available on the part of the state or local authorities to defray half of the expense of the proposed improvement of such road; it shall be the duty of the said director to cause investigation to be made as to the correctness of all the statements made in such application, and to determine whether such improvement is desirable and for the general welfare. If he shall approve such application, he shall so inform said state authorities, and then surveys, plans, specifications and estimates for improvement shall be prepared, as may be determined by the joint action of said director and state authorities and which shall also be jointly approved. After these have been approved and the director is satisfied that the portion of estimated cost to be borne by the state will be duly available, it shall be the duty of said director and state authorities, as they may agree, to advertise for bids for the carrying out of such improvement. The bids shall be made and contracts awarded under such rules and regulations as the said director and state authorities may prescribe:

Provided, That all bids shall be opened by a representative of the office of public roads in public and in the presence of a duly qualified representative of the state. All contracts shall be awarded jointly by said director and duly constituted road authorities of the state.

See. 3. That the director of the office of public roads of the United States Department of Agriculture and the state authorities shall have joint supervision over the construction, improvement, and maintenance of all roads constructed, improved, or maintained under the provisions of this act.

See. 4. That the entire cost of such construction, improvement or maintenance shall be paid by the Treasurer of the United States upon warrant from said director of the office of public roads: Provided, that upon completion of such construction and improvement

and payment therefor the said director shall certify to the duly constituted state authorities the total cost of such improvement, and it shall be the duty of the said state authorities to cause to be paid to the treasurer of the United States and by him placed to the credit of the national highway fund, hereinafter created, an amount equal to one-half of the total cost so certified by said director. Upon failure of any state to pay to the national government the amount so certified, it shall be the duty of said director of the office of public roads to withhold additional aid until such payment is made.

See. 5. That there is hereby appropriated, out of any moneys in the treasury of the United States not otherwise appropriated, the sum of \$100,000,000, of which \$20,000,000 shall be available annually for the purpose of carrying out the provisions of this act, which amount, after the payment of salaries and expenses hereinafter mentioned, shall be annually apportioned, in accordance with the provisions of this act, among the several states and territories in the ratio which the population of each state and territory, exclusive of cities of 150,000 or more inhabitants, determined by the last federal census preceding such apportionment, shall bear to the total population of the United States as shown by such census. Any portion of the \$20,000,000 annually appropriated under the terms of this act remaining unexpended at the close of any fiscal year shall be carried over to the next succeeding year and added to the amount available for the apportionment in that year. Should any state or territory fail to avail itself of its apportionment under the provisions of the act within six months from the date of passage thereof or by June 1 of each succeeding year, then and in that event the amount so apportioned shall be reapportioned among the states making applications therefor.

See. 6. That it shall be the duty of the director of the office of public roads to prepare a statement, as soon after the passage of this act as possible, showing the amount of the appropriation which may be apportioned to each state and the amount which must be provided by each state to secure the benefits of this act, and to transmit such statement to the state highway department of each state, or, if there be no such department, then to the governor.

See. 7. That the terms "post roads" and "rural delivery routes" as used in this act, shall be held to include all bridges and enlivets along the line of such road.

Senator Swanson's bill has created a fine impression in all parts of the country, and one of the leading Washington correspondents sent out last month to his papers in the middle west a story in which success for the bill was predicted. The correspondent said:

Efforts to expend national money on good roads have always been blocked by assertions that there was no constitutional authority for such purpose, but a method has been found to overcome or get around the sacred document in this regard.

Senator Swanson of Virginia has introduced a bill appropriating \$100,000,000 of national money for good roads to be expended in the next five years. He provides that it shall be expended upon roads used as post roads and rural delivery routes. They are the same thing.

If the government marks out a route for a rural delivery carrier to follow it becomes a post road. The constitution gives congress authority to "establish postoffices and post roads." With authority to establish postoffices has been the authority to build post-offices. Thousands of such buildings have been provid-

ed. By establishing post roads congress establishes its power to improve them. There is no longer a constitutional barrier.

It may not be the Swanson bill, but it will be some bill which will authorize a large expenditure for the improvement of the rural delivery post roads. It is sure to come. The rural delivery service is becoming more popular every year, and every year there is a greater demand for better roads.

Senator Swanson is a member of the postoffice committee and will have an opportunity to push his bill. More over, there is a growing belief in farming communities that they are not getting their share of the federal appropriations, and the rural communities still control congress.

Good Machinery Saves Waste.

Millions of dollars have been wasted in the fruitless and expensive efforts to keep our country roads in proper condition. This great waste, as a rule, is not due to any fault of the workers but solely to the system under which they labor, and the total lack of suitable equipment for the purpose. Road officials in all parts of the country have begun to realize the necessity for a low priced, two horse, one man machine for the proper maintenance of roads. A machine which one man can hitch a team on and do a days work whenever he has an opportunity. A machine which will accomplish a great deal more work in proportion to amount expended, and which does away with the expense, delay and difficulty of getting a big crew of men and horses together when conditions are right for immediate work.

The Glide Road Machine Company whose advertisement appears in this issue is putting out a light road and ditching machine, which, judging from the success they have met with during their first year in the business, has solved the problem of properly maintaining roads and doing irrigation work at the lowest possible cost.

Practical road men say emphatically, the manufacturers report, that they can accomplish nearly as much work in leveling their roads and keeping them in condition with the Glide machine, one team and one man a day, as with a heavy grader requiring three or four teams and 2 or 3 men to operate. One can readily see what an immense saving this would mean in the course of a year in the maintenance of roads, to say nothing of the wonderful improvement in their condition. Over 600 of the Glide machines were sold the first year this company was in business, being shipped into every state in the Union, and almost invariably the introduction of the machine in any neighborhood leads to more sales, and a corresponding improvement of roads in that territory.

The manufacturers send this machine out on free trial to any part of the United States, freight paid, and it would seem as though any road district could well afford to investigate an offer of this kind.

Catalogues, prices, testimonials from North Carolina and other satisfied users throughout the south will be furnished upon application to the Glide Road Machine Company, 370 E. St., Minneapolis, Minn.

Why West Virginia Abolished Highway Department.

The good roads enthusiasts of the country were greatly astonished a few weeks ago to learn that the state of West Virginia had taken a great step backward in the abolition of the state highway department and they looked in vain for a reason for it. It has been the experience of all states that the state highway de-

partment, when established and its functions properly understood, became at once immensely popular. With the exception of West Virginia, no state has ever thought of doing away with such a department, but all have sought to increase its powers and widen its field of influence. Recently, in commenting editorially on a local movement for good roads, the Clarksburg (Va.) Telegram "let the cat out of the bag," commenting on the action of the legislature as follows:

In view of the fact that there is to be a big mass meeting here next Thursday in the interest of better roads in this county, it is not amiss to remind the public that the recent legislature of this state acted unwisely in abolishing the office of state commissioner of public roads.

It is true that the impression went abroad and was circulated widely that that department of the state government was merely one to provide an office or two. The legislature itself seems not to have had a proper appreciation of the department and its importance to the state.

Designing politicians willingly lent aid to the erroneous declaration that it was not an efficient department, the charge being largely based on the assumption that the head of the department had but little knowledge of the subject of good roads or road-making. Mr. Charles P. Light was the head of the department, and, of course, when the legislature abolished the department it decapitated him officially so far as West Virginia was concerned.

Mr. Light's aptitude, energy, enthusiasm and earnestness, as well as the great progress made by him in putting a new department into operation and bringing it up to a point where it was about to become capably effective in producing splendid results had arrested the attention of the American Association for the Improvement of National Highways and the state of West Virginia had no sooner dispensed with his services than that great and useful organization enlisted them. The association soon learned that it had made no mistake and it has full knowledge now that it possesses on its official staff a man that knows how and does arouse public interest in the subject of good roads, one more vital to West Virginia at present than any other.

Good roads contribute to the glory of the country, give employment to idle workmen, distribute the necessities of life, the products of the fields, the forests and factories, encourage energy and make mankind better, greater and grander.

The localities in the state where good roads have been built are becoming richer, more prosperous and more thickly settled, while those which do not possess transportation advantages are either at a standstill or are becoming poorer and more sparsely settled.—Wichita Falls, (Tex.) Times.

Alleghany township, Davidson county, N. C., was the only township out of five voting to properly celebrate "Good Roads Day" May 30. Elections were called in five contiguous townships to vote on a special tax of 20 cents on the \$100 and 60 cents on the poll for good roads and the proposition was voted down in four out of the five. Alleghany will now outstrip her sister townships easily and will soon rank among the most progressive communities of Piedmont North Carolina.

The little city of Granger, Tex., has begun the work of street improvement on a large scale. \$15,000 will be spent on vitrified brick paving at an early date.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

In a recent issue of the Montgomery Advertiser was a news letter from Union Springs, Bullock county, that contained this significant statement. "All that the most imaginative of the good roads prophets have foretold about the effects of improvement of the public highways is being verified in Bullock county, where \$100,000 in road improvement bonds were placed on the market a year ago."

In this short space of time Bullock county has built 100 miles of good roads. Eight miles are built of gravel and the rest are sand-clay. The work has been done under the supervision of the county board of commissioners and county convicts have been used. The roads were laid off and built sensibly and the people of the county are pleased. The work started by the building 10 miles of road toward each of the cardinal points of the compass and then the roads were extended. The correspondent goes on to tell of the farmers bringing six and eight bales of cotton to market on one wagon, instead of two a little more than a year ago, and that cotton comes to Union Springs from within six miles of Tuskegee, Macon county, a distance of 21 miles because of the difference in the quality of the roads. All this has been brought about without the slightest increase in taxation, the increased value of the property bringing in revenue enough to take care of the interest on the bonds and create a sinking fund to take up the bonds when due.

The tremendous advantages and benefits that good roads have brought to this progressive county may be enjoyed by any.

* * *

California.

One of the most significant developments in the history of the good roads movement is that represented in the \$18,000,000 bond issue of the state of California for a chain of roads that shall link the northern boundary of the state to the southern by a continuous highway of superb construction. This mammoth project will be started during the coming summer, complete authorization having been given by the legislature.

It is believed that under the state appropriation between 1500 and 2000 miles of road can be constructed, although no surveys have as yet been made for that purpose. It is the intention to connect every important city in the state. When county roads will serve as an integral part of the state roads it is planned that the different counties shall be reimbursed to a certain extent for their part in the general expense incident to the state highway construction.

California by this important step has placed herself well in the fore-front of every state in the nation in the matter of building good roads. When the hundreds of thousands of tourists flock to California for the World's Panama Exposition in 1915 they will find good roads in every nook and corner of that beautiful state.

* * *

Kentucky.

In Kentucky there is a mighty awakening on the good roads question. Parts of the state are still far in the rear, but they are coming up. The press is getting into the fight, good and strong, and it has been the experience of other states, that something happened when

the editors got squarely in behind any proposition. The exchange editor of the Louisville Courier Journal ran through his exchanges for one day and this is a small part of what he found:

Dixon Journal: Let us hear from some of our farmers and business men as to what they think about arranging for a "Good Roads Day."

Elizabeth News: Bad roads in Kentucky cost \$2.50 per capita. Good roads under state aid will cost twenty-five cents per capita. Which are you for?

Sandy Hook Democrat: The sun is a wonder at road making, but we think it should have some assistance.

Shepherdsville News: During the spring and summer meetings will be held at various points in Bullitt County and road clubs organized. "Road week" will be made a week of road working.

Owenton Democrat: We suggest that the Good Roads Day be on the 12th day of July, when every citizen may have an opportunity to bring his dinner and have a good time and give one square day's work to the roads of his county.

Campbellsville Enquirer: Preach the gospel of good roads to thy son and to thy neighbor's son. Verily, they are not a vegetable that springeth up in the night, nor a weed that happened there and came to stay, but a result of man's untiring efforts.

Maysville Public Ledger: Tazewell county, Virginia, voted to expend the sum of \$625,000 for good roads. That's more than the entire state of Kentucky expended for good roads last year.

Burlington Recorder: The good roads boom that has struck Kentucky will give the next legislature some work on a subject of vital importance to the state.

Marion Record-Press: We are just as certain to have good roads as the judgment day is certain to come: who wants to wait that long? What good will it do our generation to know there will be five hundred miles or more of good roads in Crittenden county one hundred years from now? Good roads today interest this generation.

Ashland Independent: Why not all the counties of the state unite in a good roads movement, and observe "road week" at the same time? All cannot join in the work upon "Lincoln Way," but the counties that cannot, can build a "way of their own."

* * *

Maryland.

Maryland was the first southern state to adopt a comprehensive plan of state aid for roadbuilding. A big bond issue was provided and road-building was undertaken in all parts of the state. With the exception of certain citizens of Baltimore, and other large towns, the people have been more than pleased with the State Highway Commission and its work. The people of Baltimore claim that they are not getting their proportional part of the money being spent and there is a little friction in consequence thereof. This will probably be adjusted satisfactorily. Governor Crothers is enthusiastic over the way things are working out. He says:

Figures are the most convincing arguments we have in support of new loans for good roads. I saw with my own eyes, for example, farms in Wicomico county which have advanced in value by reason of state road

improvements from \$35 an acre to \$135 and \$140 an acre. The farmers will testify to similar enhancements in all sections of the state where good roads have been built out of the present loan.

* * *

Tennessee.

Tennessee is building good roads every day in the year. A number of counties are preparing to issue bonds already voted and elections will be called in many others soon. For the great Cross-the-State Highway planned by Governor Hooper the legislature will be asked to appropriate \$15,000 for making the preliminary surveys and no other state aid will be asked for. It is confidently believed that this project will result in untold good for the good roads cause in the state, for it has set the people to talking from one end of the state to the other.

The work of laying off and building the highway is in charge of a commission, appointed by the energetic, wide-awake young governor, of the state. According to the commission's plans it does not expect to build a model road across the state in two days. The plan at present is to open and dedicate the road on August 14-15. The biggest problem before the commission will be the building of about forty miles of road through the mountains of east Tennessee, and nearly 100 miles in middle and West Tennessee. Roads already constructed will furnish nearly 400 miles of the state highway. It is also the purpose to repair and build up the links that are now in bad condition.

The commission has set out to secure not less than 50,000 volunteers to work on the road August 14 and 15. To this end blanks have been sent out to subcommissioners and committees in counties through which the highway will pass. Secretary Gilbert stated to the correspondent of the Manufacturers' Record that replies have been received from about one-fifth of those to whom blanks were sent and that the commission now has enrolled about 18,000 volunteers. Many of these not only volunteer to work two days, but a considerable proportion express their willingness to labor two weeks, ninety days or until the enterprise is completed. The volunteers will be worked in companies and platoons, with overseers at intervals as needed.

* * *

Washington.

In Washington the good roads movement was launched four years ago with the beginning of fine highways in King county, of which Seattle is the seat of government. This work was started under the supervision of A. E. Loder, chief engineer of the present Los Angeles County Highway Commission, who constructed in all sixty miles of macadam road in this northern state. The great apostle of the good roads movement in the northwest is Samuel Hill, son-in-law of James J. Hill, the railway magnate. It is Mr. Hill's ambition to enlist Washington and Oregon in a plan to construct a north and south highway through both states to connect with the northern end of the highway which California will construct under the state bond issue. If he is successful the dream of an international highway from British Columbia to Mexico will be realized.

Both Washington and Oregon have organized state highway commissions and in both states several counties are building highways under bond issues. Around Spokane and Tacoma in Washington and in the neighborhood of Salem, Portland, Baker City and Pendleton in Oregon the mileage of fine roads is advancing by

leaps and bounds. The Portland Chamber of Commerce is the leader of the movement in the Webfoot State.

Federal Aid For Good Roads?

A county good-roads convention recently held in Wilkesboro, N. C., adopted a somewhat original and highly interesting set of resolutions. The paper sets forth the belief that the people of western North Carolina are being unjustly discriminated against in the matter of federal appropriations for public improvements. It is argued that the building of first-rate highways through the mountains is just as necessary and would yield as large returns as the opening, building and improving of canals along the coast. It appears to be the sense of the convention that inasmuch as the federal government is spending huge sums upon the latter object it is no more than right that some attention be paid to the former. The resolutions conclude by memorializing congress to authorize a suitable appropriation for this purpose.

There is no little justice in the Wilkes position. The large amounts spent under the authority of the rivers and harbors bills of the last two decades have come in for no little criticism on the ground that such an expenditure was not wisely applied. The successive items in these bills have been found, however, to be very useful when printed in the Congressional Record and distributed throughout districts which appeared to be slightly indifferent about sending certain representatives back to Washington. As a consequence, to eliminate a river and harbor bill item has appeared more than once to a sympathetic committee as too much resembling the political assassination of a fellow-member.

The trouble is that the very representatives to whom these appropriations prove so valuable are the ones who will have to pass upon the Wilkes memorial. Of course there is no good reason why an appropriation secured for good roads should not prove as effective a political asset as one for a creek. The latter form of campaign ammunition, however, is universally known—and almost universally used—while the former has its merits yet to establish.

It is doubtful whether congress at any early time will look with favor upon national aid for road-building which is done entirely within any one state. The best that the advocates of the measure can hope for is that interstate highway building may attract attention, and it will probably be found advantageous to concentrate efforts in that direction.—Charlotte Observer.

The National Good Roads Congress at Birmingham.

The city of Birmingham entertained handsomely the many delegates to the National Good Roads Congress that met in that city May 23 to 26. The attendance was large and the speeches delivered were of a high order. A number of the best of these will appear in Southern Good Roads in the near future.

The Moline (Ill.) Mail grows pessimistic over the road question in Illinois and says: "The good roads question has reached the debating point and there it seems to be stuck in the mud."

San Joaquin county, Cal., is engaged in the construction of 238 miles of fine roads under a bond issue of \$1,800,000. The grading of this section does not offer anything near the engineering difficulties that have been experienced in other counties of the state, and hence a large part of the sum appropriated can be used in actual paving. The San Joaquin highways will be in every way a credit to the state.

GOOD ROADS NOTES IN BRIEF

In McLennan county, Tex., there is a movement to issue bonds for \$600,000 to build good roads. It is planned to build a system of good dirt roads throughout the entire county and to spend but little of it on macadam.

The Columbia (Mo.) Commercial Club has started a campaign in Boone county, Mo., to secure a bond issue of \$2,000,000 for road building.

Mention has been made several times of the 365-Day Good Roads Club, of Carthage, Mo. This club is still doing business and has so aroused the citizens of Jasper county that good roads are the rule in every nook and corner and not the exception. Recently the Kansas City Commercial Club in one of its advertising tours, struck the little city of Carthage and members of this live road organization took charge of the party, whirled them over fifty or sixty miles of fine roads in less than two hours and the Kansas City boosters declared unanimously that Jasper county has the best roads of any county in the state. This shows what may be done by any really live organization by persistent effort.

The county highway engineer of Floyd county, Ga., has worked out a system of roads for the county, all radiating from Rome, aggregating 160 miles. He estimates that the roads will cost \$2,000 per mile and the necessary bridges will cost \$180,000, making a total to be met by a bond issue, of \$500,000. He suggests that a board of three trustees be appointed to spend the money, one to be named by the county commissioners, another by the city council of Rome and the third by the Merchants and Manufacturers Association, of Rome. His plan is having careful consideration and stands a good show of adoption.

The state of Iowa has secured several good roads measures recently and probably the best of these is the law providing for the dragging of the roads of every county in the state. The bill calls for a superintendent of dragging, who shall draw a salary of \$2.50 per day and expenses. Road drags must be furnished by the county and paid for out of the township road funds. Another good law is the graduated tax on automobiles, the tax being graduated according to horse-power. 85 per cent of the taxes so received will go to the counties according to the number of automobiles registered in the county, and it is estimated that the fund so raised will amount to \$200,000.

In Mecklenburg county, Va., there is much road building going on. The Chase City district is building roads as fast as fifty men and plenty of teams, wagons and up-to-date machinery can build them and half a dozen other districts are preparing to hold bond elections. They are planning to have the good roads in every township so built that they will form a continuous system covering the entire county.

Hancock county, Ga., voted last month to issue \$35,000 for the building of sand clay roads. The issue met with favor all over the county and only 26 votes were cast against it.

Alger county, Mich., will vote June 15 on a bond issue for building rock roads.

San Diego county, Cal., in 1909 voted \$1,250,000 to be used in the improvement of 448 miles of roads. Practically the entire amount will be used for grading and bridge construction.

Santa Barbara county, Cal., has already completed fifteen miles of good roads and will build a large mileage this summer. Kern and Ventura counties are alive

to the trend of the times and are waiting only to see what the state is going to do within their borders before beginning the construction of extensive road systems. Riverside county also has great plans in mind.

Hancock county, Miss., has voted bonds for \$25,000 to start a system of sand-clay roads.

The town of Groesbeck, Tex., will spend \$12,000 on street work. Seven miles of cement sidewalk will be built.

At Lorisburg, N. C., a bond issue for good roads has been carried by the township.

The city of McKenzie, Tenn., has voted bonds for \$40,000 for street paving and work will begin soon. This town is showing wonderful improvement along many lines.

Boone township, Davidson county, N. C., voted a special tax for good roads last month. The majority for the road tax was a big one.

Richmond, Va., has awarded contracts for several miles of granolithic sidewalks and a great deal of street paving.

Hancock county, Ga., has voted a big bond issue for good roads. Sandlay construction will prevail.

Decatur county, Ga., is still considering a bond issue and it is believed that it will be voted. The amount will be close to \$100,000.

The town of Bay St. Louis, Miss., will spend \$50,000 in improving its fine beach roadway.

Chattanooga, Tenn., is getting ready to spend \$200,000 for asphalt paving on all of the principal streets of the city.

News comes from Boydton, Va., that on June 17th the following districts will vote on bond issues for good roads: Boydton district on \$75,000; Buckhorn district on \$40,000; Lacrosse district, \$40,000 and Palmer Springs district on \$25,000.

Road district No. 1, Cameron county, Tex., votes June 24th on a \$250,000 bond issue for road building.

In Collins county, Tex., Celina district is to vote soon on a bond issue of \$125,000 for road improvement.

There is a red-hot good roads campaign going on in Newton county, Ga., where there is soon to be a bond election.

The Florida Good Roads Association is laying plans for increasing its membership. According to the plans of the leaders, it is proposed to add 10,000 new members. The admission fee is \$1 each and with the funds so raised a bigger and a better publicity campaign will be waged throughout the entire state. The next meeting will be held in February at Palm Beach and the campaign for new members will close then.

In Iowa the Hawkeye Highway is now under construction. It will be remembered that Iowa built a road from the Mississippi river to the Missouri in one day, a distance of 380 miles. Not content with this, another cross-the-state highway was laid off and is now nearing completion. The River-to-River road passes through the southern part of the state from Davenport to Omaha and the Hawkeye Highway passes through the northern part of the state. It runs from Dubuque to Sioux City, passing through such hustling towns as Manchester, Independence, Waterloo, Cedar Falls, Webster City, Fort Dodge and Le Mars.

A good roads meeting was held at Marion, Ala., last month for the purpose of boosting the movement to build a road from Marion to Uniontown and there was a tremendous crowd present. A special train was necessary to carry the people of Union Town to Marion for the meeting. The principal address was made by State Senator V. B. Atkins, of Dallas, Ala., a member of the state highway commission.

The city of Birmingham, Ala., which already has good streets, is contemplating spending \$300,000 for additional streets. If this is done, Birmingham will lead every city in the south in mileage of improved streets.

Good roads is a live issue in Dallas county, Ala. The people are anxious to see a system of good roads radiating from Selma, the county seat, and have voted bonds for their construction. This money is now being wisely expended. A good turnpike has been built from Selma to Mulberry, in Autauga county, the Autauga county commissioners building the road to the Dallas county line and the Dallas commissioners completing it to Selma. Perry county also wants connection with Selma and a road will be built to the Perry county line. The Dallas County Good Roads Association is the moving spirit in all of the progress being made and recently closed a campaign for members that added 100 to the roll.

The state of Illinois has showed but little interest in the good roads movement but of late, certain parts of the state have been showing signs of waking up. There has been started a movement to build two trunk lines across the state, one from Chicago to Moline, via Elgin and the other from Chicago to St. Louis via Joliet and Springfield. The first named route was in the field first and more work has been done toward getting things started than with the other. It is pointed out that the Chicago-Elgin-Moline route will eventually become a part of a great highway to the Yellowstone Park. The movement to build the road from Chicago to Joliet and on to the state line, is also taking definite shape and the state will be asked to furnish machinery and materials for building the road. The stone will come from the state quarries at Joliet.

In Wayne county, Mich., the county in which Detroit is situated, concrete roads are being built. The county has issued bonds for \$2,000,000 and is building roads that are the wonder of the age. The roads are 18 feet wide and cost \$18,000 per mile. It is probable that in the future roads will be made 12 feet wide and this will cut the cost down to about the same as first-class macadam. It is freely predicted that concrete will be the road-building material of the future, because concrete roads wear exceedingly well and the cost of maintenance is comparatively small.

Around Buffalo, N. Y., fine brick roads are being constructed. These roads have concrete shoulders and are very durable. The only thing against them is their very high cost.

New York state knows the value of good roads and it takes no hard fight to put a good roads measure through the legislature, no matter which party is in control. On May 8, without objection or debate, the state senate passed the Trombly bill appropriating \$1,500,000 as the state's share of the cost of completing an international highway from New York to Montreal. The bill had previously passed the house and went to Governor Dix for his signature.

The Council Bluffs (Iowa) Commercial Association has established a good roads fund for the purpose of contributing dollar for dollar to the fund that the farmers of the county will raise for road improvement. The fund now reaches \$8,000.

The Inter-Mountain Good Roads Association composed of the states of Colorado, Idaho, Wyoming, Montana, Nevada and Utah, will hold its second annual meeting at Pocatello, Idaho, June 22, 23 and 24. More than a thousand delegates are expected to be present. The association is backing a movement to build a network of good roads through the Rocky Mountains, with the view of making every section of the states named

accessible to tourists. This part of the country has natural scenery unexcelled in the world and should become the playground of America.

The "Waubonsie Trail," named after a famous Indian chief of the early days, is the name of a new highway proposed for the southern tier of counties in Iowa. If this road is built it will make the third cross-the-state highway for Iowa. The preliminary tour, blazing the way, has been made and active work is next in order.

In East Carroll Parish, La., the Parish has appropriated \$7,500 for road work, to which the state adds a like amount, making \$15,000 available at once.

The city of Petersburg, Va., will build 10,000 square yards of concrete sidewalks.

In Gonzales county, Tex., precinct No. 1 will vote June 27th on a \$150,000 bond issue and one the same day precinct No. 3, will vote on a \$60,000 issue, the funds in both cases to be used in road building.

Trinity county, Tex., will vote on an issue of bonds to the amount of \$40,000 to be used in building and maintenance of roads.

Anderson county, Tex., will hold an election June 24 to decide on an issue of \$150,000 of bonds for road building grand improvement.

The city of Sumter, S. C., will vote on the issue of \$25,000 of bonds for the paving of Main street.

The state road commissioners of Maryland have recently let contracts for macadam work in various counties amounting to \$300,000.

Harris county, Tex., will do a great deal of wood-block paving. Recently a contract was let for \$11,000 worth of work.

The city of Lawton, Okla., has let contracts for the paving of forty-five blocks.

The city of Lexington, Ky., is preparing to build several miles of macadam streets.

The city of Tampa, Fla., has awarded a contract for 8400 square yards of walk in the Woodlawn cemetery.

The town of Wharton, Tex., will build three miles of concrete sidewalks.

The town of Aberdeen, Miss., will spend \$25,000 in building concrete sidewalks and storm sewers.

Amherst county, Va., has been asking for bids on 4½ miles of macadam road.

The city of Baltimore, Md., has perfected plans for turning one of its avenues into a boulevard 115 feet wide.

The town of Brooksville, Fla., has about \$26,000 available for vitrified brick paving and sidewalks.

The city of Dallas, Tex., will improve nine streets in connection with the paving of Swiss avenue. Macadam and granite blocks will be used.

The United States Government is asking for bids on several miles of macadam road around Fort Sill, Okla.

Forth worth, Tex., has awarded contracts for the improving of several streets.

Gadsden, Ala., will do a great deal of street improvement work in the very near future.

Copiah county, Miss., bids fair to lead all of her sister counties in the matter of good roads. Gravelled road seems to be the favorite road in Copiah and fifty miles of this will be built during the summer and fall.

The city of Lynchburg, Va., always progressive and wideawake, is to spend \$60,000 for more good streets this summer.

The town of Maysville, Ky., will build several macadam streets this summer, using bituminous asphalt binder and building concrete curb.

Wise county, Va., has awarded contracts recently for macadamizing 125 miles of road. This county has recently voted a bond issue of \$700,000.

The city of Memphis, Tenn., has awarded contracts for 175,000 cubic yards of excavation, 48,000 square yards of tar macadam and 10,000 square yards of asphalt, wood block and bitulithic pavement. Several important streets will be graded and macadamized.

New Decatur, Ala., will spend \$14,000 on street paving, beginning next month.

San Angelo, Tex., is preparing to spend \$100,000 in improving the streets of the city. Plans and specifications for paving are being prepared and will soon be ready for contractors.

St. Petersburg, Fla., will do a great deal of paving and grading soon and will construct walks.

The Richmond-Louisiana-Gordonsville Highway Association is hard at work improving the road from Richmond to Gordonsville. This road gives connection with Washington, D. C., and will be a very important stretch of highway.

It was announced last month that the American Association for Highway Improvement, the leading good roads association of the United States, had become very closely affiliated with the Touring Club of America, and it is hoped that the connection will be profitable to both.

Oklahoma City, Okla., will repave several streets with asphalt macadam.

At Paris, Tenn., an appropriation of \$4,000 has been made by the town council to gravel certain streets.

Petersburg, Va., has awarded contracts for 10,000 square yards of concrete sidewalks.

The Virginia Peninsular Road Association is preparing to start the actual work of construction on a boulevard from Richmond to Norfolk. The road will be built of sand-clay and macadam throughout.

Richmond, Va., has let contracts for a great deal of asphalt paving, concrete walks and macadam work during the past month.

The state highway commission of Virginia has let contracts for road improvement in various counties in the state for this summer amounting to \$200,000.

The city of Bonham, Tex., has voted bonds for \$100,000 for the improvement of its streets.

In Liberty county, Tex., one precinct has voted bonds for a quarter of a million dollars, with which to build 90 miles of road.

In Nash county, Tenn., three townships have voted bonds for road building, the total amount being \$50,000.

Plaquemines Parish, La., will build a shell road 32 miles long at an estimated cost of \$16,000.

Albany, Ga., one of the liveliest little cities in the "Wire Grass Section" of Georgia, will vote this month on a bond issue of \$100,000 for street improvement.

Wake county, N. C., votes August 31 on a bond issue of \$300,000 for building a system of good roads throughout the county.

The county commissioners of Worth county, Ga., are studying the road conditions of the county and considering the matter of issuing bonds for \$100,000 for road-building.

Dallas, Tex., has let contracts for asphalt paving recently amounting to \$32,000.

A contract has been awarded for the construction of an improved road from Flint Hill, Va., to the Warren county line, the road to cost \$30,000.

The Board of Public Works of the city of Jacksonville, Fla., has awarded contracts for paving amounting to \$325,000.

Monroe county, Miss., is awaiting surveys to award contracts for the building of roads from Prairie to Aberdeen, Egypt, Strong, Muldon and Bradley to Aberdeen. \$100,000 is available.

Raleigh, the capital of the great state of North Carolina, is considering calling an election to vote bonds for \$120,000 for street improvement.

Bids are being asked in Pittsylvania county, Va., for the building of three miles of macadam.

The city of Fort Worth, Tex., is asking for bids on the laying of about 13,000,000 square yards of paving.

The hustling city of High Point, N. C., the "Grand Rapids of the South," second city in the manufacture of furniture in the country, is planning to do extensive street improvement.

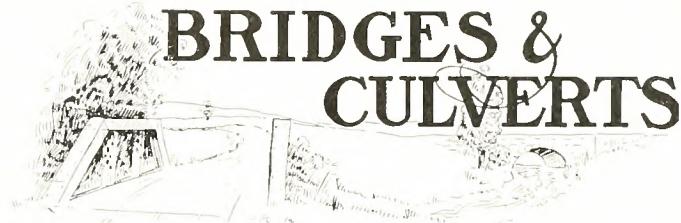
The city of Charlotte will vote next month on a bond issue of \$325,000 for street and other improvements.

Lexington, Ky., is planning extensive street improvements. Three streets will be built and two will be repaved.

Louisville, Ky., is ready to spend \$94,000 in street work.

Bexar county, Tex., is asking for bids for the construction of five miles of road.

BRIDGES & CULVERTS



The town of Brooksville, Fla., will build several bridges this summer with the proceeds of a bond issue voted recently.

Suwanee and LaFayette counties, Fla., will build a fine steel bridge across the Suwanee river at Live Oak, Fla.

Atlanta, Georgia, is preparing to spend \$328,050 in building two viaducts and making certain necessary changes of streets.

Jefferson county, Ala., is asking for bids on a fifty foot bridge near the city of Birmingham.

LeFlore county, Miss., will award the contract this month for a steel drawbridge across the Tallahatchie river, connecting LeFlore and Tallahatchie counties.

Jackson county, Mo., is to hold an election soon to pass on bridge and culvert bonds to the amount of \$40,000.

Linn county, Mo., is doing a great deal of bridge building. It has been asking for bids on a dozen new steel and concrete bridges and culverts.

The county commissioners of Rutherford and Polk counties, N. C., have awarded a contract for the construction of a bridge across the Broad river. The bridge will be 300 feet long and will afford a long desired connection for the two counties.

Choctaw county, Okla., has voted bonds for \$120,000 for building bridges and culverts.

Muskogee county, Okla., has let contracts recently for 15 steel bridges. Other bridges are in prospect and contracts may be let soon for at least 15 others and several culverts.

A fine reinforced concrete bridge is to be built on the outskirts of Fort Worth, Tex., costing about \$12,000.

Fort Bend county, Tex., is asking for bids on the construction of two bridges across the Brazos river at Thompson and Orchard.

The common council of the city of Richmond, Va., has confirmed the award of the contract for the construction of a reinforced concrete bridge across the James River for \$224,734.

Duval county, Fla., is preparing to build an expensive bridge across the Nassau river and a reinforced concrete bridge across Miller creek on the outskirts of Jacksonville.

A steel bridge is to be built across the Ohio river at Owensboro, Ky.

A double track steel bridge will be built across the Potomac river at Cumberland, Md.

The city of Independence, Mo., is preparing for an election to vote on an issue of \$40,000 of bonds for bridges and culverts.

A company has been organized at Purcell, Okla., to build a toll bridge. The capital stock is \$100,000.

Polk county, Tenn., has \$75,000 to spend on bridges and culverts, which amount was raised by a bond issue.

Bids are being asked for the construction of a costly bridge in Fort Worth, Tex.

Final plans have been completed for the erection of the Houston (Tex.) ship channel and White Oak Bayou viaduct. The total length is to be 1650 feet and it will cost \$500,000. Bids are now being called for

Brick as Road Building Material.

State Highway Commissioner C. C. Light, of West Virginia, has declared that the only material fit for road building anywhere—either in city or country—is brick. In an interesting interview given by Mr. Light upon his return from a meeting of the Washington County (O.) Good Roads Association, he said:

"Brick is the only material for the laying or paving of roads anywhere, either in the city or in the country, judging from every point of view."

"I say that, not because there are no other materials which makes good roads, but because in my estimation the material to use is the best material."

"The roads of West Virginia, speaking as a whole are deplorable, though since the creation of a department having charge of the roads, they have been very materially improved; and with the advent of automobiles the demand for better highways on the part of the roads which they must use, that a systematic system of improvement be adopted is also being heard. And that is just what it is proposed to do. There has never yet been any definite policy on the part of the state in the matter of roads and road improvements but in the future there will be. And a very definite one it will be too."

"We are busily engaged in road improvements all over the state, the work being done by counties and towns but in many cases under the supervision of our experts. Many county engineers are also competent road builders and under their direction first class highways are being constructed. We hope, however, within a few years to have a provision of the state law which will allow the department to assist materially those counties which show a desire and inclination to build good roads. I believe that the state board of control at the next legislature will ask that definite laws be passed by which it will be possible for us to assist counties in their road building."

Mr. Light is very enthusiastic over the Ohio road laws where each year the state will put up an equal sum of money with a county, up to \$40,000 to be used in road building. This is being quite generally taken advantage of over the state and for the most part brick roads are being built. "In Washington County, from where I just came," said Mr. Light, "during the past two years there have been over ten miles of paved roads built with the state help, not to mention the several miles built by the city of Marietta itself."—Dixie Motoring.

The seat of war now has moved east into Ringold

and Decatur counties where the same spirit of rivalry has come to the surface. A special train brought an army of boosters from six towns along the south route in these counties. They came with three brass bands and old Chief Waubonsie himself (?) in a glory of war paint, gay feathers and red blankets. The special was crowded with business men who came to impress on the officer of the Trail Association the importance of selecting the route they represent.

Decatur City raised \$2,500 in one day for the trail if it comes that route.

Mr. J. L. Gooding of Kellerton made a decided hit in his impersonation of old Chief Waubonsie, the noted leader of the Pottawattomie Tribe for whom the Trail is named.

The Trail Association will send a committee to inspect the route suggested by the boomers.

All great minds come from great mothers. Imagine a great mother dressed a la mode!

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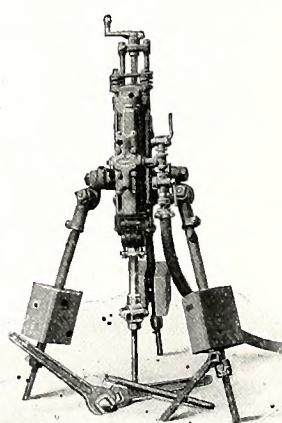
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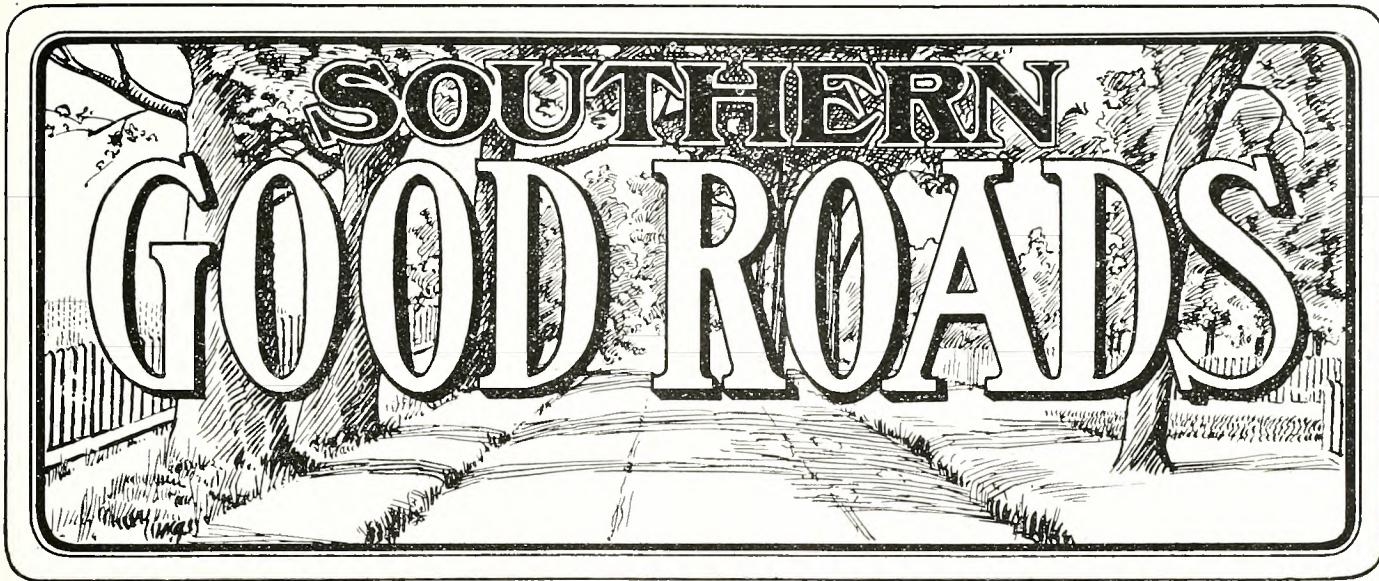
WOOD ROCK DRILLS

Makers of the Rock Drill that can be "cleaned up with a sledge hammer" and "wiped off with a scoop-shovel" and yet "stay with you."

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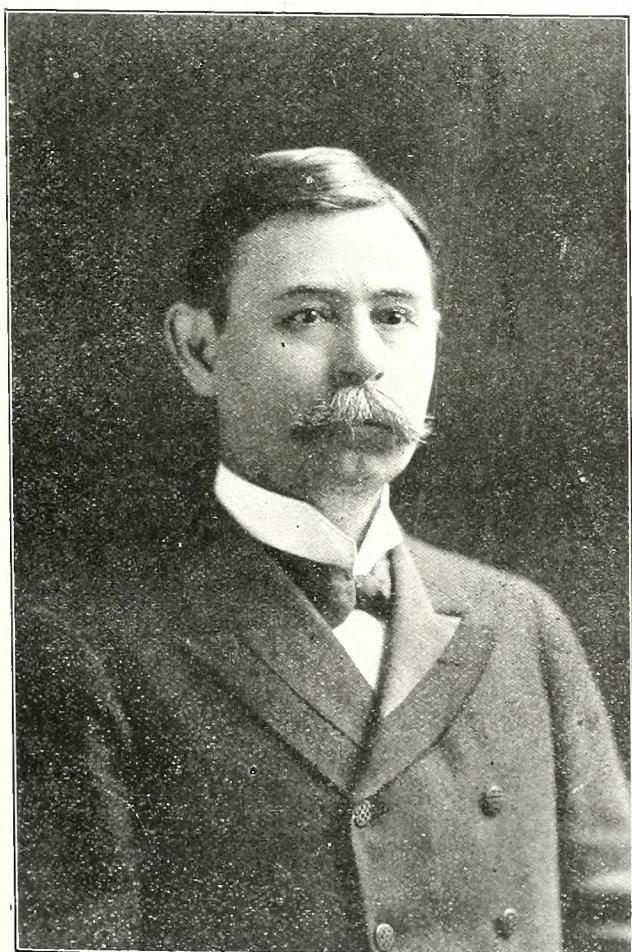
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Government Aid For Improvement and Maintenance of Postal Roads

Extract of Speech by HON. F. M. SIMMONS, Delivered in United States Senate, June 23, 1911



HON. F. M. SIMMONS
United States Senator From North Carolina

By far the most pressing need of the farmer and the most pressing need of the country is good roads and improved highways. We have the finest railways in the world and the poorest highways. The government has helped to build these railroads and develop this splendid system of long-distance transportation. Why should it not help to build the equally important system of short-distance transportation—the country highways over which the produce of the farm must be hauled before it reaches these national highways?

No one will deny the importance of cheap and quick transportation from ocean to ocean, from port to port, and from city to city. Is not quick and cheap transportation just as essential from the farm to the railway station or to the river landing? Does not the fact that transportation from the farm to the station is 30 times higher than from the station to the point of ultimate distribution appeal for remedy?

If sound public policy requires that so much be done as we have done by legislation and otherwise to cheapen railroad rates, does not the same policy require that something be done to lessen the rate of transportation from the farm to the railroad?

Not only is the subject of good roads the most important which now confronts the farmer and one of the most important now before the people of the country at large, but it is the one in which the people are most deeply interested.

There can be no doubt about the constitutional power of the government to appropriate money to aid in the construction and improvement of our public roads. That question was fought out in the early days of the Republic.

There can be no escape from the conclusion that the constitutional power to establish post roads is as broad as that to establish post offices, and that the power to establish post roads includes the power to construct, improve, and maintain them.

Aside from considerations of public policy in this matter, I submit that the Government has incurred a moral, if not a legal, liability to contribute at least to the maintenance of public highways of the country by reason of the use which it is making of them in the performance of its constitutional duty to supply the people with mail facilities.

Of the 2,150,000 miles of dirt roads in this country the Government is to-day using over 1,000,000 miles for star routes and Rural Delivery Service. It has established them into post roads, and it is actually using them every day in the year, except Sundays and holidays, to carry the mails.

These roads have been constructed chiefly by the farmers and are maintained by taxes in a large measure paid by them. The Government has contributed nothing to their construction and contributes nothing to their maintenance.

The Government uses the railroads to carry the mails, but it pays for this service, and usually pays a high price for it. On the other hand, it not only uses the farmers' road for the identical purpose without paying a cent for its use or maintenance, but requires the farmer, besides furnishing the road, also to keep it in good condition; and if he fails or refuses to do so, it discontinues his mails.

In conveying the mails to the farmer the Government is not doing a charity, but is performing a duty it can not rightfully escape, and I submit that the Government has no more right to appropriate the farmers' road to its use without compensation than it has to appropriate the railroads to the same use without compensation.

There would therefore seem to be a legal as well as a moral obligation on the part of the Government arising out of the use of these roads to at least contribute to their maintenance.

But, Mr. President, in addition to this there is a strong economic reason in connection with the use of these public highways as post roads why the Government should contribute not only to their maintenance, but to their improvement—it is the saving which will accrue to the Government in the expense of the star route and Rural Delivery Service from good roads.

On account of the establishment of rural delivery 23,000 post offices have been discontinued, aggregating a saving in salaries of \$8,000,000; likewise, there has been a discontinuance of star route service to the amount of \$18,000,000, cutting off a total of \$26,409,000 of expense.

The total mileage of the rural routes in operation on June 30, 1910, was 993,068, the average mileage per route being 24, and the average number of miles of daily travel by rural carriers was 986,993.

Mr. Gallinger: Mr. President—

The Presiding Officer (Mr. Curtis in the chair.) Does the Senator from North Carolina yield to the Senator from New Hampshire?

Mr. Simmons: Yes.

Mr. Gallinger: Will the Senator kindly restate the amount of saving by the abolition of post offices, post routes, and star routes.

Mr. Simmons: I estimate it at \$26,000,000.

Mr. Gallinger: Has the Senator the figures, approximately, of the expenditures for the Rural Delivery Service?

Mr. Simmons: No; I have not. I think it is about \$40,000,000.

Mr. Gallinger: \$40,000,000. So that the abolition of the rural post offices and the curtailment of the star route service pays a large portion of the expenses of the Rural Delivery Service.

Mr. Simmons: All of it, except \$14,000,000.

Mr. Gallinger: That is very interesting. I am glad to know the fact.

Mr. Simmons: Yes; and, as the Senator from Virginia (Mr. Swanson) suggests to me, the sale of stamps would probably pay that.

The average cost per mile traveled is not quite 12 cents, exclusive of substitutes and of toll and ferriage service. On nearly one-half of the entire roads of the country the Government is now delivering the mails at a cost, say, of 12 cents a mile, and it is plain that any improvement of these roads would reduce the cost of this service.

If through road improvement the time required in covering the route could be lessened one-third or one-fourth, it is obvious that there would be a saving in the cost of the service from \$10,000,000 to \$15,000,000. On the basis of the present mileage, and without adding a single dollar to the present appropriation, the



Sand Clay Road in Moore County, North Carolina, Near Pinehurst

service could be extended from 200,000 to 300,000 miles, carrying the daily mails to hundreds of thousands of farmers who are now denied them.

In addition to these reasons growing out of the direct pecuniary interest of the Government in better roads for mail purposes, I submit that the Government has an indirect and general interest, arising from its duty to promote the public welfare, which invites and justifies its co-operation in the maintenance and improvement of the postal highways.

The prices of products depend not only upon the cost of production, but also upon the cost of distribution. Whatever, therefore, adds to the cost of the transportation necessarily adds to the ultimate cost of the product.

In recognition of this economic principle there has been much congressional legislation in recent years looking toward Government control of railroads, with a view to establishing reasonable transportation rates.

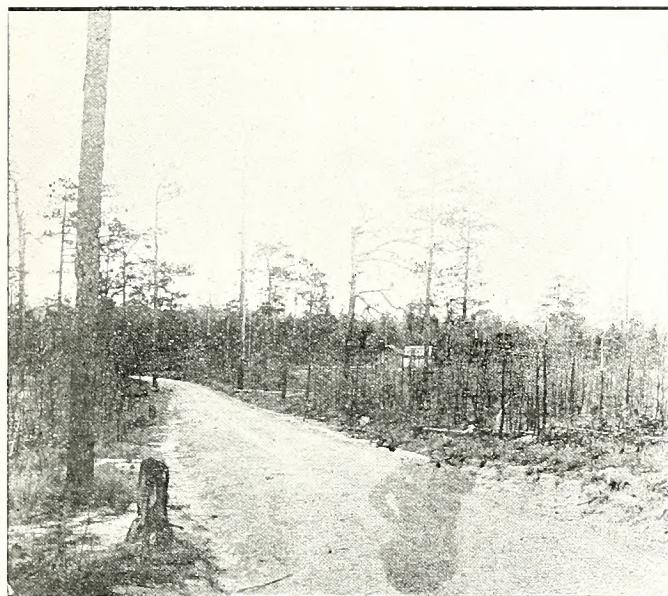
While railroad rates may still be somewhat too high, speaking generally, it may be said that adequate and cheap facilities exist for the carriage of products from the railroad station to the markets. But while this is true, on account of the bad condition of the roads, the

initial charge—the cost of hauling from the farm—is excessively high.

The difference in the cost of transportation by rail and by dirt road is as 1 to 30. Of course, this difference is not all due to bad roads, but it is fully twice as great as it would be if the standard of our public roads were put upon a parity with that of our railroads.

This excessive cost is not only a burden upon agriculture, but it is a tax upon the consumer of its product. The value of farm products is computed at \$9,000,000,000, and as only two-thirds of this amount is consumed at home, the balance has to be marketed, and the average haul for this purpose from the farm to the railroad is estimated at 9 miles. Of the 2,150,000 miles of road over which this haul must be made, about 175,000 miles have been improved; the balance, or nearly 2,000,000 miles, is still unimproved dirt road.

These roads are at best indifferent, frequently positively bad, and sometimes almost impassable. Annual-



Sand Clay Road, Pinehurst, North Carolina

ly 300,000,000 tons of farm products are hauled over these roads at a cost estimated by the Secretary of Agriculture at 23 cents per ton-mile. If these roads were improved, he estimates that the cost would be reduced to less than half that amount.

According to consular reports the cost of hauling in Germany, France, and England, where the roads are maintained in the best possible condition—indeed, on my trip to Europe a few years ago I did not see a road that was not macadamized—is frequently as low as 7 or 8 cents per ton-mile.

So, if it costs the farmer, as calculated by the department, \$600,000,000 to market his product over our present roads, \$300,000,000 could be saved annually if they were put in reasonably good condition, and, if in as good condition as those abroad, a much larger sum—probably \$400,000,000.

When I first read this estimate of the Secretary of the probable saving to the farmer from good roads I thought it was too large, but an analytical study of the cost of hauling the cotton crop of the South—a subject with which I am, in a measure, familiar—caused me to revise my conclusion.

Cotton has to be hauled when picked to the gin, and then carried to the market, and the seed are likewise to be hauled. This is only a part of the hauling in con-

nexion with the cotton crop. It does not include fertilizer and other items.

A crop of 12,000,000 bales will make 3,000,000 loads. The weight of the seed is about twice that of the lint, and there will be about 6,000,000 loads of seed. Thus there will be about 9,000,000 full loads.

Putting the cost of hauling at \$2 per load, it would amount to \$18,000,000.

If by good roads that expense could be reduced, say, one-half the department's estimate, the saving would be about \$9,000,000.

Mr. Gallinger: Mr. President—

The Presiding Officer: Does the Senator from North Carolina yield to the Senator from New Hampshire?

Mr. Simmons: With pleasure.

Mr. Gallinger: I ask the Senator, and I ask it entirely for information, whether the states of the south have, to any considerable extent, made appropriations for the betterment of the roads in that section of the country?

Mr. Simmons: The states, as such?

Mr. Gallinger: Yes.

Mr. Simmons: The States, as such, have not to any considerable extent, but the counties and municipalities have largely. For instance, just a few days ago one county—Iredell—in my State voted a bond issue of \$400,000 for good roads, and within the last few years quite a number of other counties have voted almost as large amounts for this purpose. The State of North Carolina, however, has appropriated a small sum to be expended under the state geologist for advice and engineering assistance to counties constructing roads.

Mr. Gallinger: That amounts to the same thing practically.

Mr. Simmons: It amounts to the same thing.

Mr. Gallinger: I will say to the Senator that I have long believed—

Mr. Simmons: I wish to say to the Senator that all over the south this is the question of paramount interest to the people—

Mr. Gallinger: Yes.

Mr. Simmons: And they are responding to it by bond issues that a few years ago would have appalled them. They now vote them readily.

Mr. Gallinger: I will say to the Senator that I have long been of opinion that the Federal Government might well co-operate in the betterment of our roads, and I think at one time I introduced a bill in the Senate touching that matter.

Mr. Simmons: Yes.

Mr. Gallinger: In our section of the country, somewhat despairing of Federal assistance, we have been making very large appropriations from the State treasury for that purpose. Massachusetts has spent a great many millions. New Hampshire, which is a small state, voted two years ago a million dollars, and I think we have spent probably a million and a half dollars for that purpose, and I was merely wondering whether that spirit of advancement had taken possession of the South, as I thought likely it had. To my mind it makes no difference whether the counties or the municipalities vote this money, or the State appropriates it directly from the State treasury.

Mr. Simmons: It does not make one particle of difference.

Mr. Gallinger: It amounts to the same thing.

Mr. Simmons: I want to say to the Senator from New Hampshire that the statistics show that the amount expended in my State for good roads has increased in the past five years 100 per cent. In 1910 over two millions of bonds and about one million of taxes were ex-

pended for this purpose. The amount this year will be much larger.

Mr. Gallinger: I am pleased to know that.

Mr. Swanson: Mr. President—

The Presiding Officer: Does the Senator from North Carolina yield to the Senator from Virginia?

Mr. Simmons: Yes.

Mr. Swanson: I should like to say to the Senators from North Carolina and from New Hampshire that the State of Virginia has inaugurated a system of state aid to roads. In Virginia the convicts work on the roads, the State paying the entire expense—feeding, guarding, and clothing the convicts—the materials and the machinery being furnished by the county. In ad-

Mr. Swanson: That is, a macadam road?

Mr. Gallinger: Yes; very thoroughly constructed.

Mr. Simmons: In the level section of my State, where I live, roads can be constructed at a cost of about \$300 to \$500 a mile.

Mr. Swanson: May I state to the Senator from New Hampshire, if the Senator from North Carolina will permit me, that by the adoption in Virginia of this system of State aid to roads we have had one of the most wonderful developments of State roads there that any State possesses. We have built in the last four years about 600 miles of macadam road. In addition to that, the counties have issued in the last few years bonds in order to get State aid. The county had to furnish an



A Famous Mecklenburg County, North Carolina, Macadam Road. Two Common Horses Pulling Twelve Bales of Cotton to Charlotte. Before This Road Was Macadamized It Took Two Horses to Pull One Bale of Cotton to Charlotte.

dition, where the counties can not get convicts from the State the State treasury appropriates \$250,000 a year on condition that the counties or localities furnish an equal amount.

Mr. Gallinger: I will ask the Senator from Virginia and the Senator from North Carolina whether in their States there is good road material available or whether they have to send—

Mr. Simmons: I am going to discuss that a little later.

Mr. Swanson: As far as Virginia is concerned, we have experimented. In sections of Virginia we have been able to construct very fine roads equal to macadam roads, at an expense of \$1,000 or \$1,200 a mile.

Mr. Gallinger: It is costing us, I will say to the Senator; for what we think is a better type of road, about \$5,000 a mile.

equal amount, had to furnish material in order to get convicts, had to furnish money in order to get the aid the state gave; and I will state, if the Senator will permit me—

Mr. Simmons: I should like to have the Senator from Virginia elaborate it.

Mr. Swanson: That has produced such a movement in Virginia, from one end of the State to the other, that I am satisfied that if the Federal Government will make an appropriation of money for road improvements conditioned on an equal amount being furnished by the State or local authorities, with joint supervision, joint action, joint building, joint agreement on where the road shall be placed, like they do in all the States where they have State aid, it would produce a great and wonderful improvement, and we would have the same experience in the United States; the local author-

ties, in order to get State aid, would furnish five or six times as much as is furnished by the state.

Mr. Warren: May I ask the Senator from Virginia how long since the system of using convicts to construct roads was initiated in his State?

Mr. Swanson: We commenced about five years ago.

Mr. Warren: It is entirely satisfactory?

Mr. Swanson: It is satisfactory. Theretofore our convicts had been worked in the penitentiary under contract, making shoes. About five years ago we passed a law providing that all convicts whose terms do not exceed five years in the penitentiary and all jail prisoners shall be compelled to work on the public roads.

I wish to say in this connection it has not only been satisfactory as a paying investment for road improvement—but it has been extremely beneficial to the health and morals of the convicts themselves.

Mr. Warren: I should like, as the subject is very interesting to me, because as I understand it the legislature of the State which I have the honor to represent in part in this Chamber has just authorized the employment of convicts for road making, to have it still further elaborated. As I understand the Senator, the State works these convicts on the State roads, laying out various State roads, to which the counties add their aid in the way of cash, or are State roads distinguished from county roads?

Mr. Swanson: No. Here is the system in Virginia, and which has been adopted in a great many other States recently. Other States have passed similar laws. Louisiana passed a law shortly after the Virginia law, I think. We started it.

In my inaugural message as governor I recommended it. It passed the first legislature. The system we have there is that convicts are furnished on the appli-

cation of each county in camps, I believe, of about 50.

Mr. Warren: Supported and managed by the county?

Mr. Swanson: No; the State furnishes money enough to guard them, feed them, clothe them.

Mr. Warren: And keeps control of them?

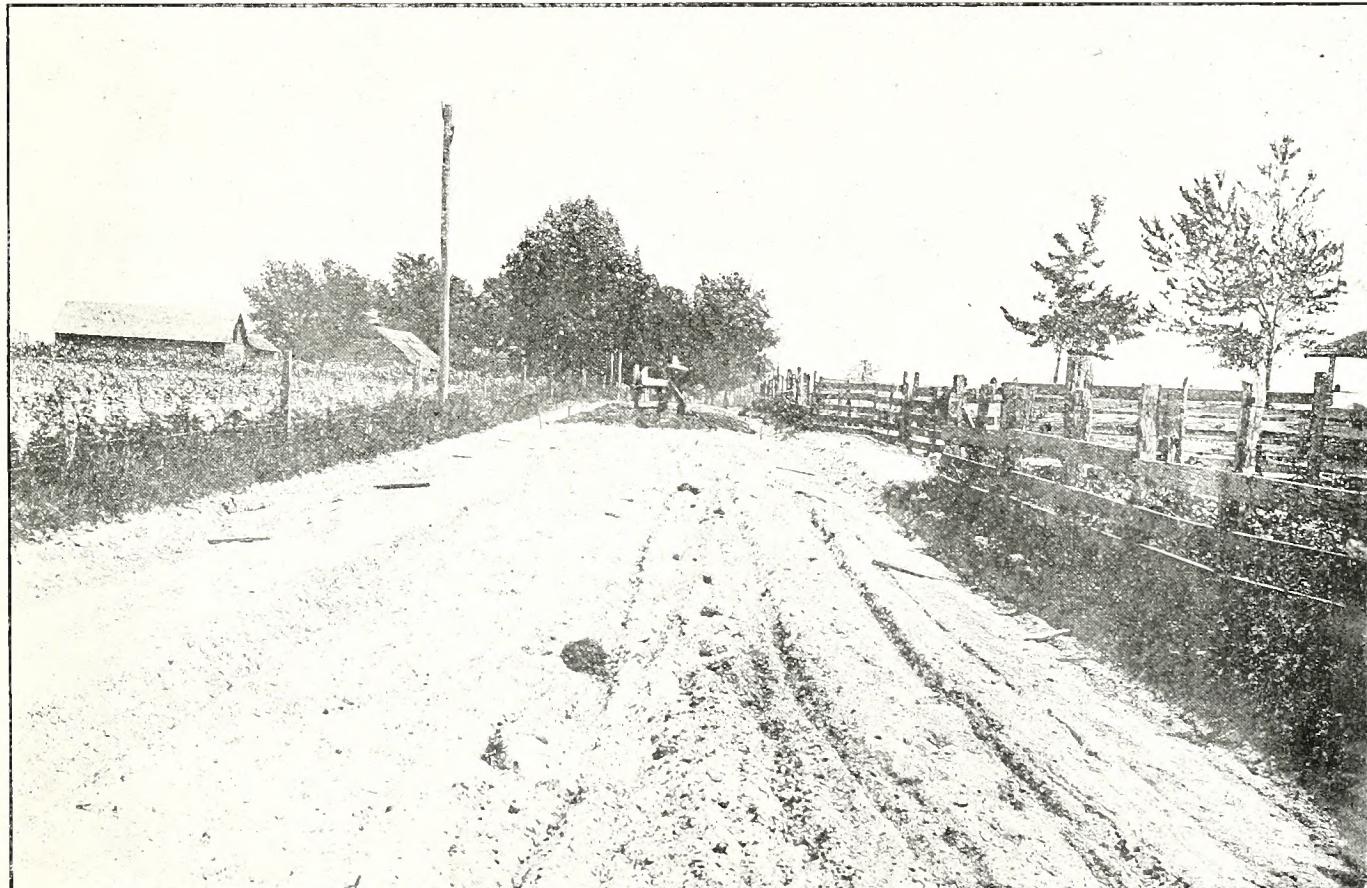
Mr. Swanson: And medicine for them. It keeps absolute control of them. So there can be no sickness, no maltreatment, or excessive work. They are inspected by State authorities. The State has a department of health, which sees that these men are kept in a good, healthy condition. The county furnishes the material, the county furnishes the machinery, and it is estimated that in the construction of roads through convicts, the State furnishing the labor, the State pays about 40 per cent of the cost of construction, and the material and the machinery and other expenses, furnished or provided by the local authorities, amount to about 60 per cent.

Mr. Warren: Does the State contract in cash through the county's hands or does it contribute sufficient only for the support of the convict force which it throws into use on the road?

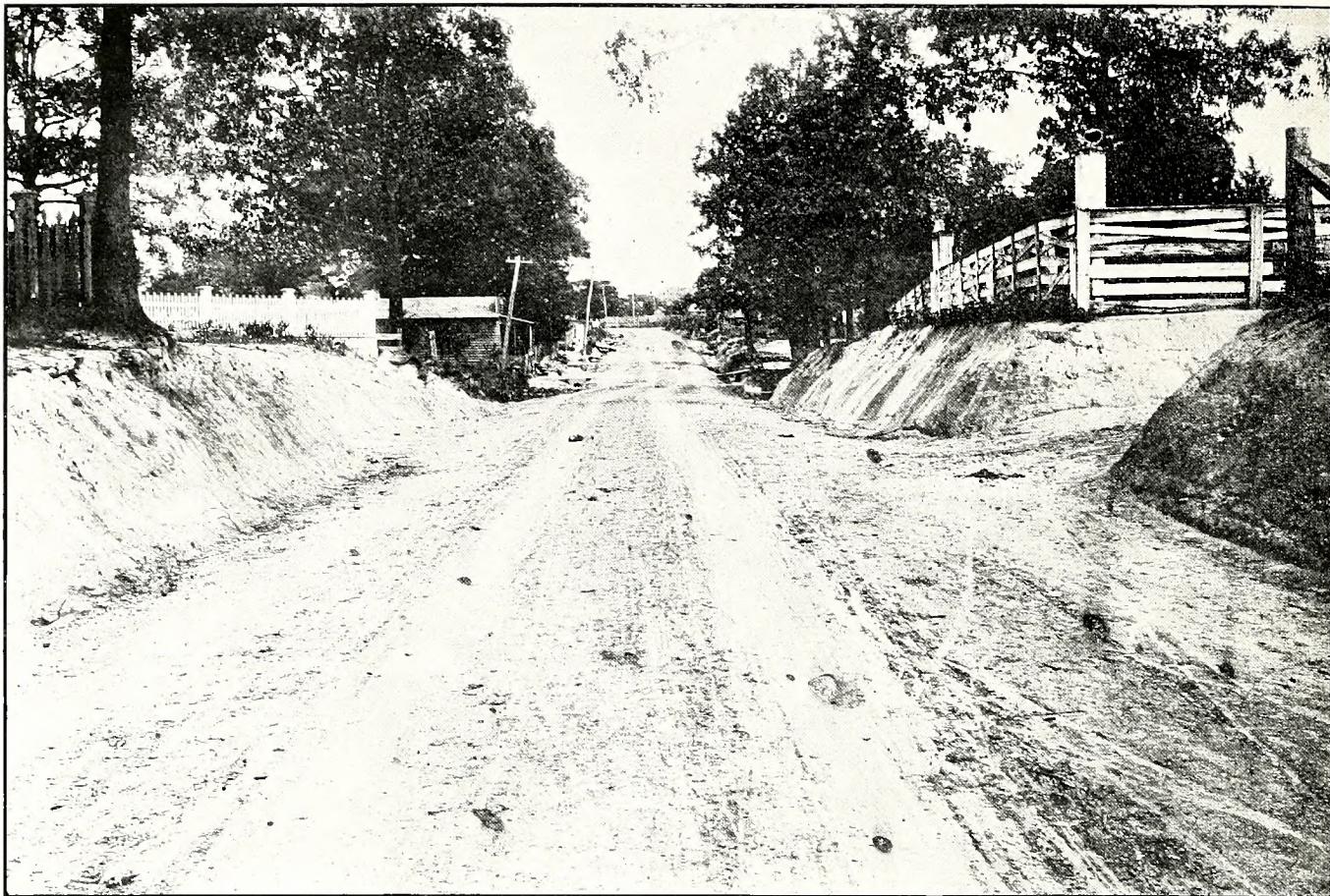
Mr. Swanson: The Virginia law is that counties which get convicts can not participate in the appropriation of cash for road purposes. There are not enough camps to go into every county and treat every section of the county equally fair. The Virginia law provides that counties which do not have convicts get the State aid of \$250,000, divided equally among the counties that do not have the convict camps, according to the taxes that they put into the treasury.

Mr. Warren: Do I understand that there are county convicts who are also thus employed?

Mr. Swanson: The county convicts belong to the State. For instance, the circuit judge or corporation judge is authorized—



Building Sand Clay Road Near Williamston, N. C. Spreading Clay on Sand



Sand Clay Road Near Williamston, North Carolina

Mr. Warren: To take convicts from the county jail?

Mr. Swanson: To take convicts from the county jail and put them on the State convict road force.

Mr. Simmons: If the Senator from Virginia will permit me, I will state to the Senator from Wyoming that in North Carolina we have a system which has proved very satisfactory to us, but which is somewhat different from that in Virginia.

Mr. Warren: I want to hear all that the Senator from North Carolina may say, but the main thing I want from both Senators, if they will be kind enough to give it, is, first, is it of advantage to the State itself; second, to the counties; and, third, and more important, is it to the advantage and the betterment, moral and physical, of the convicts themselves? I assume it must be, from what the Senators have said. I have intense interest in all the Senator from North Carolina has said and may say upon this most interesting subject—good roads; how to build and finance and keep in repair, and so forth, as well as treatment of the convict question.

Mr. Simmons: I will state that the North Carolina system is different from the Virginia system, in that the convicts who work on the public roads in North Carolina are worked by the counties instead of by the State. We have a general law by which any county can organize a convict force. The courts of that county are authorized, upon the conviction of certain offenses, to sentence the convicts to the roads in that county. Surrounding counties that have no convict force are authorized also to send their convicts to the counties which have complied with the law and organized a force. In a large number of counties this system has been adopted, and ample provision has been made for carrying it out, and a large part of the road work

in those counties is being done by convicts. The results have been satisfactory. It has greatly advanced the cause of good roads, while the outdoor employment has improved the moral and physical condition of the convicts.

Mr. Warren: Mr. President—

The Presiding Officer: Does the Senator from North Carolina yield further to the Senator from Wyoming?

Mr. Simmons: Certainly.

Mr. Warren: I want to say before the Senator takes his seat, so that he may reply if he wishes, that his subject is a most interesting one, and I have believed that in the sparsely settled new States, where there are very large areas of public lands and where they have never participated in the grant or distribution of the swamp lands, certain of those public lands might properly be placed at the disposal of the State government, to be used in connection with this mode of road building which the Senator has so well described. I say this so that any observation he may wish to make in regard to that feature of it may be included in his remarks.

Mr. Simmons: The subject mentioned by the Senator from Wyoming is a new one to me, but it is very interesting, and he makes a valuable suggestion.

I know of no better disposition that can be made of those lands. I thank him for the suggestion and would like very much to confer with him on the subject hereafter. But, Mr. President, my remarks have already extended to a much longer time than I had expected. I will resume and finish them.

Mr. President, \$300,000,000 may be an overestimate of the actual annual loss to the farmer from bad roads, but the loss on the single crop of cotton shows that the aggregate is sufficiently large to furnish an irresistible

argument for action to put a stop to this great national waste.

Admit that it is not practicable to save the total amount estimated, yet it is apparent that a great saving can be made through better roads. As this saving would doubtless be shared by the farmer with the consumer in lessening the price of foodstuffs, both the farmer and consumer would be benefitted, they would be enabled to buy more; they would make larger purchases; that would be to the advantage of the tradesman, to the advantage of the manufacturer, and of the transportation companies. There would result a general diffusion of benefits. The saving would not be at the expense of others; it would cheapen the cost of marketing, without entailing any loss to anyone. The saving would inure to the benefit of the farmer, in the first instance; and as it would enable him to sell at a lower cost, in the end the benefit would be shared by the consumer.

The cost of making good roads, while considerable, is small compared with the benefits to be derived. Especially is this true of road construction in the south. In that section, where we have sand and clay convenient, the cost of the sand-clay road is not great; and where these ingredients are mixed in proper proportions, they make a road inferior to none in cheapness and durability. The cost ranges from \$350 to \$550 per mile. Recently I have contributed largely to the building of a mile of this character of road over a heavy sandy surface at a cost of a little above \$300, and it is one of the best roads I have ever seen all the year round.

In many parts of the country sand-clay roads are not practicable; there the gravel or macadam roads will have to be built at a cost ranging, according to climate, altitude, and surface conditions, from \$1,500 to \$5,000 per mile.

The cost of road construction in these sections will be large, but not prohibitive; besides, as 90 per cent of the travel is over less than 50 per cent of the high-

ways, it will not be necessary to use this expensive material except on the main avenues of travel.

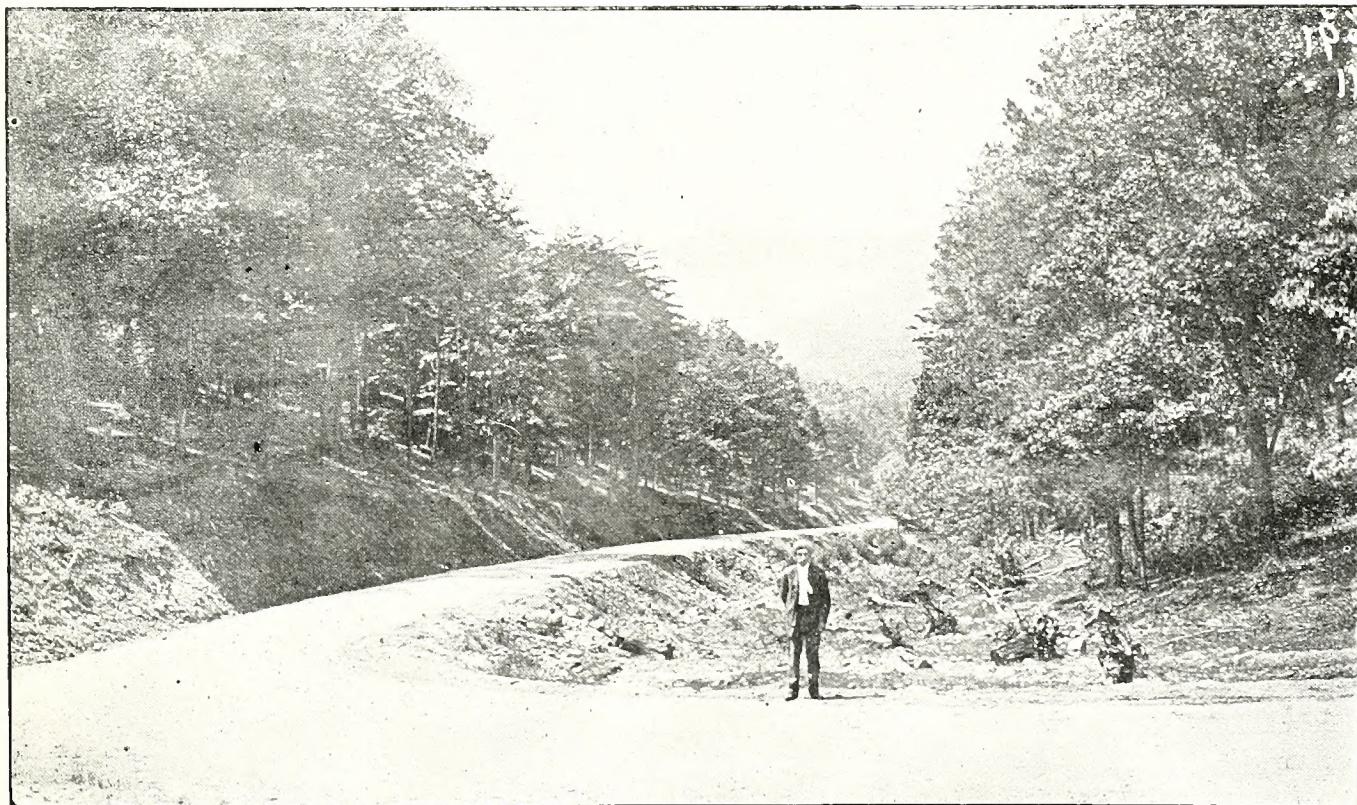
Europe has built macadam roads everywhere. So can we where necessary. It is true distances in proportion to population are greater here than in Europe; but, on the other hand, we are wealthier and our population is rapidly concentrating and thickening..

To subserve the needs of commerce and travel, we have built railroads over hills and mountains and under great rivers, with an outlay always great, sometimes stupendous. Why should we then balk in building these auxiliary arteries? We have reached the stage in our national development where we can not afford to leave anything undone, the doing of which will promote the national welfare, and where the object to be promoted is national as well as local the Government should join in the doing of it.

Heretofore the demand on our energies and the local condition of our country life were distinctly against any great effort to improve our highways. The railroads constituting the arteries of commerce had first to be substantially completed.

We have built about 240,000 miles of railroad at a cost of about \$14,000,000,000, and our needs in that respect have measurably been satisfied. Population has thickened in the older settled sections, products have multiplied, the use of the local highways have largely increased, and the country has at length reached that stage of development which calls for a like development of our system of public highways.

There has, therefore, come into existence a purpose to have better roads, a purpose responsive to a demand arising from national conditions, and this desire for improvement has led to agitation which has resulted in the formation of associations to promote this desirable object. In perhaps every State there is a State association to press forward this work, and there is a national association with the same object. The purpose of all these associations is to promote legislation for the improvement of highways, to organize loc-



Macadam Road, Cumberland Gap, Tennessee. United States Object Lesson Road

cial associations, and to stimulate the construction of good roads.

Wherever, as the result of this movement, good roads have been constructed the practical benefits have been immediate and far-reaching.

In 25 selected counties of 12 States in which 40 per cent of the roads had been improved the increase in population in the decade ending 1900 was on an average of 30,000 to the county. In 25 counties in the same States where only 1 per cent of the roads had been improved the population during that period, instead of showing an increase, actually decreased 3,000 to the county. Equally marked has been the effect of road improvement upon land values.

Wherever better highways have been introduced these values have increased in a greater or less degree. This increase is seldom less than 20 per cent, and sometimes as high as 100 per cent. The large increase in the value of the abandoned farms of Massachusetts in recent years has been notable. This increased value has been coincident with the improvement of the roads there, and is, I am advised, largely attributable to that.

Good roads have also brought about better conditions of country life. Not only do they lessen the expense of marketing the crop, but they make country life less irksome. They bring the farm and the town nearer together. Measured by travel the town may be two hours distant on a bad road and only one hour distant on a good road, and in carrying a load to market the farmer may make one or two trips, according to the road.

Last, but by no means least, good roads exert a material influence in promoting or retarding education. In many States provisions are now being made to carry the children to school because of the distance of the schoolhouse, resulting from the consolidation of school districts.

In five States which rank highest in good roads the average school attendance was found to be 78 out of every 100, and in five states that rank lowest in improved highways the average school attendance was 59 out of every 100.

In short, bad roads tend to isolate rural conditions. They render it more difficult to pass about, impede travel, restrict intercourse, interfere with school attendance and churchgoing, promote illiteracy, and are in many other ways a hindrance to progress.

The value of good roads is fully appreciated.

The need is felt.

Conditions now make their betterment imperative.

The people have at last fully awakened to their advantage.

They are ready to participate in the work.

The situation of the country is favorable to the undertaking.

The rural delivery invests the subject with a peculiar interest to the Government, while the progress and welfare of the country is involved.

Economically, industrially, socially, and in every respect the subject invites action.

The Government should do its part to promote the work.

It is too late to contend that the Government should not lend its aid.

It has already spent millions of dollars on waterways.

It has contributed hundreds of millions to railroads.

It has legislated billions in aid of manufacturing.

As a result, manufacturing and transportation have developed faster than agriculture. They have reached a much higher standard of efficiency and excellence. It is now necessary to foster farm life. Rural develop-

ment has not kept pace with that of the cities and towns. The conveniences and the advantages of urban life are in great contrast to the disadvantages of life on the farm.

While the advantages of our cities are equal to those found elsewhere the conveniences of country life in Europe are far greater than those found here. The country now needs our attention and our best endeavors to promote its development.

The bill I have introduced appropriates \$1,000,000 to be expended by the Secretary of Agriculture in co-operation with the Postmaster General in the improvement of roads over which rural delivery is or may be established, provided the local authorities shall contribute an equal amount for the improvement of the routes selected.

It provides for an investigation and report to Congress of the best and most economical method of improving roads, the cost of such improvement, what amount thereof the Government should contribute and upon what conditions, including the feasibility of raising money for this purpose through a Federal license tax on automobiles engaged in interstate travel, together with a recommendation of a comprehensive plan of Government co-operation to this end.

It will be seen that, while the appropriation now proposed provides for an initiation of Government aid, the proposition is essentially tentative and experimental and is directed largely to eliciting information to enable Congress to work out a scheme of general application.

It is a mere beginning, cautious indeed, but in line with the policy pursued by the Government in the inauguration of rural and city delivery, irrigation, postal savings banks, parcel post for rural routes, and so forth.

In addition to a direct appropriation for this purpose, when the report and recommendation called for in the bill is made Congress will doubtless give consideration to auxiliary methods of providing funds for promoting the object in view.

I have provided in the bill for a report by the Secretary of Agriculture upon the feasibility of imposing a license tax upon automobiles engaged in interstate traffic for raising funds with which to carry on this work on the part of the Government.

Mr. Bacon: I should like to make an inquiry of the Senator from North Carolina.

Mr. Simmons: I have simply proposed that as a subject for investigation.

Mr. Bacon: I wish to make another suggestion in that connection, if the Senator will permit me. I do not know whether his suggestion goes to that extent or not, but I think the license should be graduated according to the speed used by the automobiles in traveling over the roads.

Mr. Simmons: I entirely agree with the Senator about that.

Mr. Bacon: I am not jesting about it. I am in serious earnest. I think that an automobile which will go through the country in a decent, respectable, quiet style ought to be permitted to do so at a reasonable rate, but one that goes at a speed which makes it dangerous for anybody to be in the neighborhood of the road, to travel on it or to cross it, in my opinion ought to be made to pay a tax which will be sufficient to deter them from any such indulgence.

Mr. Gallinger: Mr. President—

Mr. Simmons: I will suggest to the Senator from Georgia in this connection that the danger is not only increased by the speed, but the injury to the road is greatly increased.

Mr. Bacon: Certainly; and not only the injury to the road but the dust raised by them makes it unbearable to be anywhere near the road for half an hour afterwards.

The Presiding Officer: Does the Senator from North Carolina yield to the Senator from New Hampshire?

Mr. Simmons: With pleasure.

Mr. Gallinger: I rose to emphasize precisely what the Senator from North Carolina has himself stated, as to the danger from an automobile running at great speed—and they utterly violate the laws of every State when they get on our highways—and also the destruction of the roads which results from the great speed on the part of the automobile. As an illustration I will take our beautiful macadam roads in New England, costing from \$5,000 to \$6,000 a mile. The surface of them is destroyed in a very short time, and we have got to repair them every year. We have a tar preparation which we are now using that protects them very well. But it is a consideration of vast moment that while the people have been taxed to construct these roads we are permitting a certain class of people, usually in violation of law, to run this great juggernaut over the roads at a rate of speed which destroys them in a very short time. I think they ought to be taxed, and taxed very heavily, and I am glad to say that in our section of the country that matter is receiving very serious attention.

Mr. Simmons: I will say to the Senator that with a view of getting information upon all these phases of the matter I have provided expressly in the bill I have introduced for an investigation and a report to Congress upon all the phases of the question, and especially upon the feasibility of a national registration and

license tax on automobiles engaged in interstate traffic.

The scheme of raising money for this purpose by a Government license tax upon automobiles engaged in interstate travel is an interesting one, and will doubtless receive thorough consideration. A number of States are now raising large sums for this purpose through the medium of a State license tax on these machines.

There are half a million automobiles in the country now, and they will rapidly multiply as road improvement progresses until here, as in Europe, they will in part take the place of the railroads for a certain class of travel.

Estimating that one in every five of these machines will be used in interstate travel—that, I will say, is not quite one-third of the estimate which is made by the department officials with whom I have conferred about this matter—a fee of \$10 on machines so used would yield an annual revenue of \$1,000,000, without interfering with the license charge imposed by the State. Undoubtedly there are possibilities in the suggestion of a license tax, and its feasibility doubtless will receive consideration from Congress on the coming in of the report, should this present proposition become a law.

If the practical results of this measure, if adopted, are satisfactory, as I am sure they will be, there is no reason to doubt the early adoption by Congress of a comprehensive and well-devised plan of national co-operation which will eventuate in advancing the postal highways of the country to a condition commensurate with the public needs and in keeping with the national standard of progress.

The immediate effects of the adoption of this bill can



Road to Private Estate, Miami, Florida

not fail to be advantageous. It will stimulate interest throughout the country and give shape and direction to the influences now at work for road improvement.

Of course the work will be carried on through the Office of Public Roads of the Department of Agriculture, which has already done so much in arousing public interest and in wisely aiding and directing local efforts.

Up to this time the work of this department has been confined largely to elementary instruction to local road builders, lectures, object lessons in supervision, and advisory work. Under this act the power of the department officials in these respects will be greatly enlarged, while the means will be supplied for experimental work of building short stretches of good roads in the various States of the Union.

The result in actual betterment of roads, while great, will be small compared to the results which will flow from the impetus which will be given to the movement for good roads throughout the country.

Mr. Works: Mr. President—

The Presiding Officer: Does the Senator from North Carolina yield to the Senator from California?

Mr. Simmons: I shall conclude in a moment.

Mr. Works: Before the Senator concludes, I should like to ask him whether in his own State there is any general system of improving highways?

Mr. Simmons: If the Senator will wait until I have finished my sentence, I shall be glad to answer, as I am closing.

Mr. Works: Very well.

Mr. Simmons: Manifestly the time is ripe for the Government to enter upon this co-operative work. The conditions are similar to those conditions in agriculture which led the department to engage in experimental farm work—a step forward which has proved a great advantage to the farming interests. It would be difficult to overestimate the beneficial results of this experimental farm work. Some of them have been surprising. The leaven of improved methods is working, and its effects are manifested in increased production, in greater diversification of crops, and in enlarged profits. The whole country and all the people are the beneficiaries.

Shall the Government, having so auspiciously started upon the work of reclaiming the great and honorable calling of agriculture from the drudgery to which conditions had condemned it, now halt and hesitate to do the one thing needful to restore it to its rightful position of primacy among the great industries of the Nation? I hope not, I think not, and I had almost said I know it will not.

Now, I shall be glad to yield to the Senator from California.

Mr. Works: Mr. President, I should like to ask the Senator from North Carolina whether in his own State there is any general system of constructing and improving the highways as State highways?

Mr. Simmons: I will state to the Senator that there is no general system in my State of State highways, but there is now on foot, recently inaugurated and over which the people have become very much worked up, a great scheme to build a central highway from the sea to the mountains. That road will pass through about 25 counties, and its length will be between 450 and 500 miles. The present plan is for that road to be built by the counties through which it passes. While there has been no State appropriation for the improvement of State highways, we have legislation which provides for a county system which any county can adopt. Many of the counties have taken up this subject with great vigor, and, as I have stated, probably in the absence of

the Senator from California, are imposing taxes and issuing bonds for that purpose. There are a number of counties in my State that have issued bonds in amounts from three to four hundred thousand dollars at one time for the improvement of the roads in those counties.

I mentioned a little while ago one county which only a few days ago, within the last month, I think—not one of the largest or richest counties, but a progressive county—voted \$400,000 in bonds at one time for road improvement. That is going on all over the State. I should say that one-third in number of the counties, comprising about one-half of the State, have issued bonds, or are now preparing to issue bonds, for that purpose, while many of the other counties are doing the same work by current taxation.

Mr. Works: Mr. President, I ask these questions because, under the provisions contained in this bill, the co-operation which is provided for would necessarily have to be with the local authorities in each county where there is no general system under the control of the State.

This is a question in which the people of my State are very deeply interested. We have very lately voted bonds to the amount of \$18,000,000 for the purpose of constructing State highways throughout the State. In my own county we have voted \$3,500,000 in bonds for the purpose of bettering the roads in our county. That feeling is spreading all over the State of California, and naturally I am interested in any movement of that sort which is likely to bring results. I was only undertaking to find out as nearly as I could what would be the probable effect of the provision by which the officers of the National Government are authorized to co-operate with the State authorities in undertaking to improve the condition of the highways in the different States.

Mr. Simmons: I will say to the Senator—I am very happy to have the information he gives in reference to the work of constructing and improving roads in his State—The bill I have introduced appropriating a million dollars for experimental work on rural routes to be selected by the Secretary of Agriculture in co-operation with the Postmaster General, specifically provides:

That the State or the local subdivision thereof in which such improvement is made under this provision shall furnish an equal amount of money for the improvement of the road or roads so selected.

So that it would be a matter of adjustment by the Secretary of Agriculture with the local authorities or the State, as the case might be.

At the conclusion of his remarks Senator Simmons asked unanimous consent to have the bill on which he had spoken printed in the Congressional Record. There being no objection, the bill was ordered to be printed in the Record as follows:

A bill for experimental improvement of rural delivery roads by the Secretary of Agriculture in co-operation with the Postmaster General, for investigating the subject of Federal registration and license of automobiles used in interstate travel, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby appropriated the sum of one million dollars, out of any money in the Treasury not otherwise appropriated, to be expended by the Secretary of Agriculture in co-operation with the Postmaster General in improving the conditions of roads to be selected by them over which rural delivery is or may hereafter be established, such improvement to be for the purpose of ascertaining the increase in the terri-

tory which could be served by each carrier as a result of such improvement, the possible increase of the number of delivery days in each year, the amount required in excess of local expenditures for the proper maintenance of such roads, and the relative saving to the government in the operation of the rural delivery service, and to the local inhabitants in the transportation of their products by reason of such improvements: Provided, That the State or the local subdivision thereof in which such improvement is made under this provision shall furnish an equal amount of money for the improvement of the road or roads so selected. Such improvement shall be made under the supervision of the Secretary of Agriculture.

Sec. 2. That the Secretary of Agriculture and the Postmaster General are hereby directed to report to Congress within one year after the ratification of this

Act the result of their operations under this Act, the number of miles of road improved, the cost of same, and the feasibility and desirability of a Federal licence tax on automobiles engaged in interstate travel, and such other information as they may have acquired in connection with the operation of this Act, together with recommendations as shall seem wise for providing a general plan of national aid for the improvement of postal roads in co-operation with the States and counties, and to bring about as near as possible such co-operation among the various States as will insure uniform and equitable interstate highway regulations, and for providing necessary funds for carrying out such plans of national aid, if it shall be deemed feasible to provide the same or any part thereof otherwise than by appropriation from the Treasury for that purpose.

Progress of Road Improvement in the South

By HON. LOGAN WALLER PAGE, Director U. S. Office of Public Roads

In 1904, the Office of Public Roads conducted an investigation to determine the status of road improvement in the United States. The information revealed the fact that there were in this country 2,151,570 miles of public highways of which 7.14 per cent were improved, while there were in the sixteen states of the south 685,151 miles of which only 27,185, or 3.87 per cent were improved. It was also shown that the total road expenditures for the United States during the year 1904 was about \$80,000,000, or \$37 per mile, while in the sixteen southern states it was only about \$21,600,000, or \$31 per mile. From these facts it is apparent that the south was less active in the improvement of its roads than any other section of our country.

The fact that so little had been accomplished in the way of road improvement may be charged largely to the system of administration in vogue at that time. None of these states had established a State Highway Department, or taken any steps whatever in that direction, excepting Delaware and Maryland, and these two states had only enacted temporary legislation looking to this end. The prevailing system of administration was one of extreme localization, which vested all road affairs in the local officials, with no provision for skilled supervision, and allowed the payment of a large part of the road taxes in labor, 48 per cent of the total amount expended in the south in 1904 being paid in this manner. It was necessary, therefore, that this system of administration should be reformed, before any great progress could be hoped for.

In the first place, an extremely localized system of administration cannot produce the best results. It is enumbered with a multiplicity of road officials, none of whom has sufficient individual authority to formulate or direct a definite road policy for any county, and each receiving such a small salary that he cannot afford to devote but a small portion of his time and attention to the subject. Such a system should be abolished and the administration of road affairs in each county placed in the hands of a competent engineer, or superintendent, skilled in road construction and maintenance. This official should have full authority to formulate plans and prosecute the work of improving the highways throughout the county, subject to the direction of the governing body of the county, and should receive sufficient compensation to justify him in devoting his entire time and attention to the work. The method of part payment of road taxes in labor should

also be abandoned, for the reason that it provides an unskilled and irresponsible class of labor, inferior to that which could be hired with the equivalent in cash, and results in no improvement of the roads. In fact, in most instances, those who pay their road taxes by this method have no other thought or desire than merely to discharge their tax obligation, and in most cases the roads would be in better condition if they remained untouched.

The trend of legislation since 1904, however, has been in the interest of these reforms. In many instances, the general state road laws which were in force for so many years, localizing road work in counties, were so amended as to render them less defective or superseded by special county laws adapted more fully to present day conditions. While this method of legislating specially for different counties is not to be commended, because it is better to have an efficient general law under which all counties in the state may operate, yet it has enabled the more progressive counties desiring to improve their highways, in states having no such general law, to break away from the old system and procure the enactment of special laws, through the operation of which they have made great strides and improved a large percentage of their roads. Funds have been raised by special taxation, or by bond issues, for carrying on the work, which could not have been done under the old laws which acted in a restrictive manner. As an illustration of what is being planned by some counties, Jefferson county, Alabama is to vote on a \$1,000,000 bond issue, while in Virginia, Tazewell county has just issued \$625,000 and Wise county \$700,000 in bonds; and as an evidence of substantial improvements made, fifteen counties selected in the various states of the south have improved 3,503 miles of sand-clay, gravel, macadam, and shell roads since 1904, or an average of 233 miles per county.

In some counties the work of reform has gone to the extent of adopting a partial system of patrol. This is undoubtedly a great step forward, as the patrol system is recognized as one of the best for maintaining highways. An instance of the recent adoption of this system in the south is Granville county, North Carolina, a special law having been enacted in 1909 providing for a patrol system. A similar system is being practiced in Wayne county, Georgia, and in Montgomery county, Alabama, and every county which can possibly do so should emulate the example of these counties. In

addition, various other changes have been made in the administration of county road affairs.

The states of Delaware, Georgia, Maryland, North Carolina, Virginia, Louisiana, and Alabama have enacted laws whereby the states participate in highway work. Some of these states, however, have not carried their reforms sufficiently far.

North Carolina makes no appropriation from the state treasury for aid in construction work, but appropriates \$5,000 each year to be expended under the state geologist in giving advice and engineering assistance to the counties of the state. This has proven a wise ap-

Virginia works its state and county prisoners on the roads, and in addition makes an appropriation of \$250,000 each year for apportionment among the various counties, all of which is expended under the supervision of the State Highway Department. If all the state and county prisoners in the south were placed upon the roads and made to perform good and efficient labor under competent supervision, a wonderful reformation could be brought about with a comparatively small cash outlay.

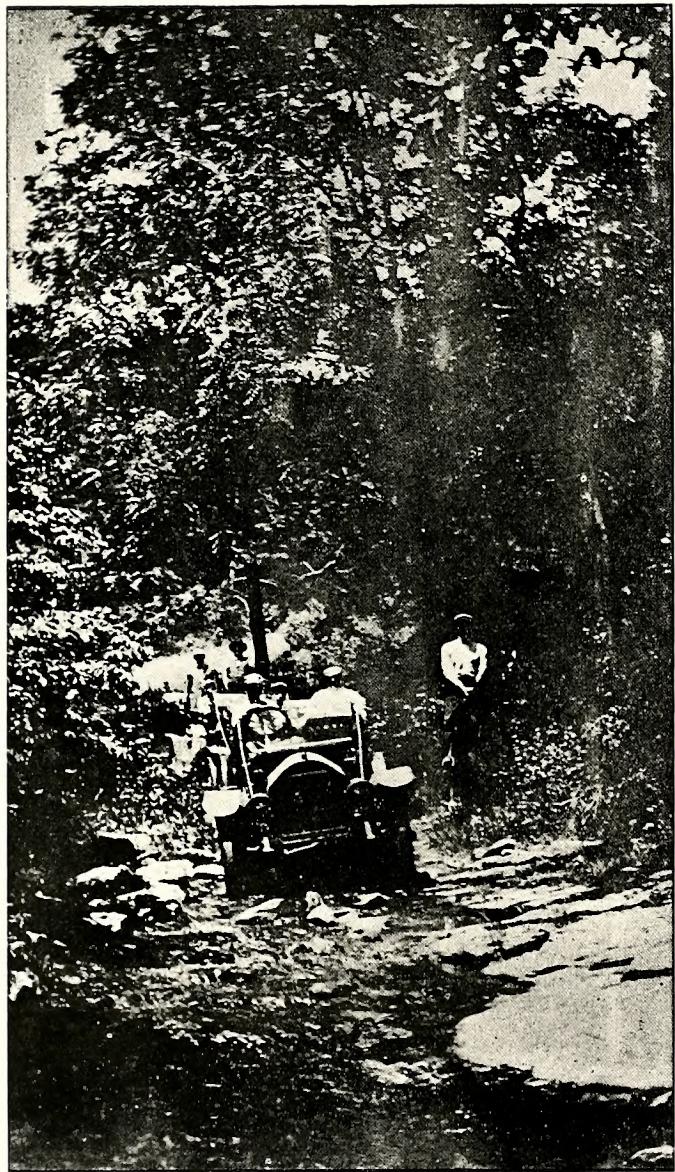
Maryland has also established a State Roads Commission for the purpose of giving advice and assistance and of supervising the construction of all state-aid and trunk line roads for which the state makes appropriations. Up to December 31, 1910, this state had appropriated from the state treasury, or through the sale of state bonds, about \$3,300,000, and has available from the state treasury for expenditure during 1911, \$1,250,000.

During 1910, the Louisiana legislature passed an act creating a State Highway Commission, and providing for the appointment of a State Highway Engineer, and appropriating money to aid the parishes (counties) in the improvement of their roads. This law also provides for the use of state prisoners in road building. For this purpose, a tax of one-fourth of a mill on each dollar of taxable property in the state is levied for creating a highway fund, to which is added the surplus revenues of the State Fish and Game Commission. The legislature of Alabama at its recent session enacted a law creating a State Highway Commission, providing for the appointment of a State Highway Engineer, and applying \$154,000 annually from the net proceeds of the convict labor fund to the state highway fund.

These reforms have all been brought about since 1904, and, as an evidence of their wisdom and efficiency, during the short period elapsing up to 1909, inclusive, 25,000 additional miles of road were improved, making a total of improved mileage at that time of 42,280, or 6.67 per cent of all roads in the south. From this, it will be seen that during the brief period of five years you have increased the mileage of your improved roads by practically 100 per cent, and this during what might be termed a transition period in the administration of your road affairs.

Another potent result of these reforms, and one which gives promise of greater progress in the future, is the interest and enthusiasm which has been aroused in the subject of road improvement in the south. That this enthusiasm is of a substantial character is evidenced by the fact that more funds have been raised by taxation and bond issues for expenditure during 1911 than ever before. At the present date there are available for expenditure throughout the sixteen southern states the sum of \$40,652,000, or \$59 per mile, which is practically double the expenditure of 1904. There will be, however, other large funds available during the year, as many counties are agitating, and will no doubt vote large bond issues for road improvements. It is further shown that the south is keeping pace with other sections of the country in the matter of road improvement by the fact that practically one-third of all funds available for expenditure on roads during 1911 are available in the sixteen southern states, while in 1904 the other states of the union expended practically four times as much as was expended in the south.

Conditions in the south require road improvement more urgently than in any other section of the country, for the reason that the roads are subjected to more continuous and heavy traffic during the winter months, and as they are nearly always wet at this season, they cut up very badly and become almost impassable. In



In the Mountains, Near Old Fort, North Carolina
The Present Rocky Trail That is Called a Road

propriation and the good results of it are reflected in the enthusiasm which is manifested throughout that state in the interest of highway improvement, and also in the increased mileage of improved roads in 1909 over 1904, which was from 2.5 to 6.9 per cent. Georgia has increased its mileage of improved roads during this period from 2.68 to 7.26 per cent. This has been done largely through the working of convicts upon the roads. There are to-day 4,618 state and county convicts who work upon the roads of Georgia, and that state is finding this a profitable way of utilizing her prisoners.

order to have good, hard roads during this period, it is necessary that they be properly graded, drained, and surfaced. In the north conditions are different. There the roads are partially protected with ice and snow most of the time during the winter months, which affords a good smooth surface over which traffic may pass.

To offset this advantage, however, the roads of the south can be improved more cheaply than those of the north. In the south labor is cheaper, and convict labor can be utilized and the road building season is longer. Also a cheaper type of road can, in most cases, be built in the south, as sand-clay roads can be constructed, which will answer all ordinary traffic requirements and which cost only about one-tenth as much as macadam or other roads suitable to northern conditions. Then, too, your roads are not subjected to as severe frosts and freezes in the spring and fall as in the north, and consequently the injury from this prolific source of damage necessarily makes the cost of maintenance less. So, while the south stands in the greatest need of road improvement, its conditions are most favorable for meeting that need.

To illustrate how much more cheaply the south can improve its roads than other sections of the country, sand-clay roads are built in Georgia at an average cost of \$387 per mile, and the average cost of sand-clay for five states from which the information is available, is \$572. Gravel roads are built as cheaply as \$790 in Alabama, and the average cost of gravel roads for eight states from which the information is available, is \$1,725. The cost of macadam roads in the south ranges from \$1,800 per mile in Louisiana to \$7,660 in Maryland, and the average for nine states, including Maryland, is \$3,825. As a contrast to this, in Ohio where it

requires an unusually high standard of road to withstand the traffic and the climatic conditions, they have built, many miles of brick roads, and recently, at Ravenna, contract was let for the construction of five and one-half miles, 14 feet wide, to cost \$77,000, or an average of \$14,000 per mile. Also a contract for the construction of two and one-tenth miles of bituminous macadam road in Butler county, Ohio, has just been awarded for \$15,085.84, or an average of \$7,183.73 per mile. In Massachusetts, the average cost of roads is as follows: Sand-clay from \$700 to \$1,000 per mile; gravel, from \$2,000 to \$3,500 per mile; and macadam \$8,000 per mile. The average cost per mile in New York for construction under state-aid from January 1, 1898, to January 1, 1910, was \$9,165.

The maintenance of roads in the south is also more cheaply accomplished than in the northern sections of the country. According to the report of the State Highway Commission of Massachusetts in 1909, the average cost of maintenance on macadam roads, where automobile traffic is light, was from $1\frac{1}{2}$ to $2\frac{1}{2}$ cents per square yard per year which amounts to from \$140 to \$220 per mile, and where automobile traffic is heavy, it would be more. It is further ascertained from this report that the average cost of maintaining state-aid roads in the various towns of the state during 1909, at the joint expense of state and towns, was \$203.

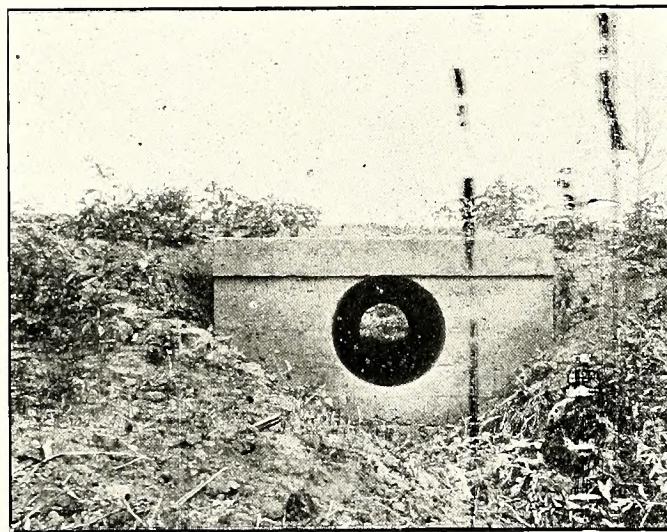
The south today is enjoying an era of prosperity and expansion. Improvements are in progress along all lines. Its population is increasing each year; its railroad mileage is being extended; its manufactures enlarged; and its agriculture is each year opening up to new possibilities, and bringing new areas under its domain. In order, however, for this growth to continue, it will be necessary that the roads of the south



Rocky Road Near Bean Station, Tennessee. This County is Now Spending \$100,000 on the Roads From a Bond Issue

be improved; for bad roads will checkmate its increasing population, impede its railroad development, hamper the enlargement of its manufactures, and restrict its agriculture.

The farming interests of the south stand in greatest need of improved highway. Your soil and climatic conditions make possible the production of almost every variety of crop. In addition to the staple crops, fruits and vegetables can be grown every month in the year, and with proper transportation facilities the northern markets can be supplied with these during the winter months at highly remunerative prices. At present the staple crops of the south are corn, cotton, and tobacco, but statistics show that these are not the most profitable, for the average value per acre of wheat produced in the United States is \$7.03, of oats \$7.34, of corn \$8.72, and of cotton \$15.27, while the average value per acre of vegetables is \$48 and of small fruits \$80.80. If the most profitable crops are to be produced more attention must, therefore, be given to trucking and fruit growing. Bad roads, however, place an embargo on this class of farming, except in the immediate vicinity of market or railroad station, because such products must be put upon the market while fresh, and in an unbruised condition, which cannot be done over bad roads.



Concrete Culvert Built With Collapsible Form, Near Greenville, S. C.

Considering the staple crops, however, enough money could be saved annually in the cost of transportation to pay for the improvement of the roads. The average cost per mile of hauling corn in the United States is about 7 cents per hundred pounds, but the average cost in North Carolina is 12 cents per hundred pounds. In eleven of the southern states the average cost of hauling corn is 15 cents per hundred pounds, or more than double what the average is for the United States. Most of the corn crop of the south is for home consumption, and therefore it will not be a fair calculation to assume that all of it is hauled to market. The eleven states referred to, however, produced 855,279,000 bushels of corn in 1910, and if we assume that only one-fifth of it, or 171,000,000 bushels, was hauled to market, the total cost at the prevailing rate was \$14,400,000. If corn were hauled as cheaply in these states as is shown to be the average cost for the United States, one-half of the above amount, or about \$7,200,000, would be saved annually on their corn crop.

The cotton, however, is strictly a southern states crop and practically all of it is hauled from farms to

ginnery or to the shipping point. Therefore, we can safely calculate on this entire crop. The average cost of hauling cotton is about 15 cents per hundred pounds, or 80 cents per bale, the average distance is 11 miles, the average time consumed for each load one day, and the average load 1,702 pounds, or a little more than 3 bales. The cotton output of 1910 was 11,969,757 bales, most all of which is hauled first from farm to ginnery and then from ginnery back to farm, and from farm to market. Computing the cost of hauling this crop at 80 cents per bale the total cost would reach the sum of about \$9,500,000. If the main roads were improved the average load of cotton could be more than doubled without increasing the horse power, which would reduce the cost by more than half. If this were done, the annual saving on the cotton crop alone would be at least \$4,800,000.

For every bale of cotton produced there is about 1,000 pounds of cotton seed, which has to be hauled with the cotton from farm to ginnery and back to farms and then a large percentage of it is hauled from farm to shipping point for shipment to the oil mills. The average haul for cotton seed is about 10 miles, the average load 1,654 pounds and the average cost 15 cents per hundred pounds, or \$3 per ton. For every bale of cotton produced, there is practically one-half ton of cotton seed, which make about 6,000,000 tons from the 1910 crop. Computing this on the basis of \$3 per ton for hauling, the total cost of hauling this crop of cotton seed was about \$18,000,000. If only one-third of the cost of hauling the cotton seed could be saved, the saving would be about \$6,000,000, which added to the saving on the cotton would make a total saving of about \$11,000,000.

The south is better able financially to build its roads today than ever before. It is estimated that 60 per cent of the traffic of the country passes over 20 per cent of the roads and that, in order to accommodate the largest percentage of traffic, it is only necessary to improve with permanent construction this 20 per cent of the roads, the remaining 80 per cent to be placed in good condition by proper drainage and grading. About 6 per cent, or 42,281 miles of the roads of the south are improved, leaving only 14 per cent, or 94,746 miles, to be improved in order to attain the desired 20 per cent. If this 94,756 miles were improved at an average cost of \$2,000 per mile, the total cost would be \$189,512,000, and the annual saving of \$11,000,000 on your cotton crop, would more than pay for it in twenty years, and if we add to this the possible saving on your corn crop it would pay for it in ten years.

The increase in real estate values which would result from such improvement would easily offset its cost. The effect of road improvement on real estate values has been variously estimated at from \$2 to \$10 per acre. There are 362,027.852 acres of farm lands in the states of the south, and if we assume that this land will increase in value \$5 per acre, as a result of 20 per cent of your roads being improved, it would add about \$181,000,000 to the wealth of the south, which would practically pay for the necessary improvements.

Aside from these facts, however, the wealth of the south has increased in such proportions within the last decade that a tax sufficient to raise funds for prosecuting this work of improvement could be levied without imposing any undue burden upon the people. In 1900 the total assessed value of taxable property in the sixteen southern states was \$5,465,069,547, or 17.4 per cent of the total for the United States. In 1910 this had almost doubled, the taxable valuation being \$10,346,212,579, which is 18.5 per cent of the total in the United

States. Not only has the assessed valuation of the south increased in greater proportion than that of the rest of the country, but the rate of taxation per thousand dollars is generally lower than in the other sections

of the country. From every standpoint therefore the south is in excellent condition financially for improving its roads and no better investment of its funds can be made than for this purpose.

Notes From Ringwalt's Transportation System in the United States

Despite modern improvements many land and water routes which are now favorite avenues of internal commerce were traversed for centuries by savages. Their trails formed our common roads, turnpikes, and railways. The canoe was to the Indian what the horse is to the Arab. The waterways are such that the entire country, from north to south, can be traversed by following the Mississippi and Missouri. The continent can be crossed from east to west by following the St. Lawrence, the Great Lakes, some of the northwestern tributaries of the upper Missouri, the Columbia and its tributaries, and a few short overland marches.

Earliest settlements were on coast and later along the banks of rivers, so that transportation was all by water.

For a very considerable period after the Braddock expedition, the pack horse system continued to furnish the only method of transportation between the early settlements in southwestern Pennsylvania and western Virginia. Each horse without a rider carried two bushels of salt weighing 84 pounds to the bushel, besides, a few light articles super-added. A path across the mountains was scarcely two feet wide.

Up till recent date nearly all the interior transportation in Mexico was continued on donkeys or pack mules, and the customary charge was one cent a pound for 20 leagues. In 1784 transportation by pack-horses from Philadelphia to Erie was \$2.49 a ton.

Under the colonial laws very little work was done, partly because the Indian trails furnished the principal facilities needed and partly on account of the difficulty of providing for paying the cost of any considerable amount of road making. In a large portion of the south bridle paths, many of which were originally Indian trails, formed main avenues of local travel during all the early decades of the nineteenth century. There are still said to be some of the mountain watersheds of southern states which have been inhabited for many years in which no roads passable with wheeled vehicles have ever been made.

Up to the time of the revolution, it may be said that no improvement whatever had been effected in transportation facilities except the addition of the horse to the list of aids; that in thickly settled portions of the country improvement had been made of the use of ships and boats, and a few sections had tolerably fair common roads. Later travel was almost universally on horseback.

The nineteenth century was well advanced before traveling in carriages became at all common.

The Roman maxim is "The first step in civilization is to make roads." In southwestern Pennsylvania much opposition was manifested by owners of pack-horses to widening the roads. In 1673 the first post rider between New York and Boston made the trip in three days. In 1695 letters might be forwarded eight times a year from the Potomac to Philadelphia. In 1710 Parliament passed an act for establishing a general postoffice for all her Majesty's dominions. In

1722 a Philadelphia paper states that the New York post was three days behind the time and not yet arrived. In 1729 the mail between the two cities went once a week in summer and once a fortnight in winter. In 1764, if weather permitted, mails were to leave every alternate day. In 1799 the number of postoffices in the United States was 75.

The driver frequently had to call to the passengers in the stage to lean out of the carriage, first on one side and then on the other, to prevent it from oversetting in the deep ruts with which the road abounded.



Gravel Road, Near Savannah, Georgia

"Now, gentlemen, to the right," at which the passengers all stretched their bodies half out of the carriage to balance on that side. "Now, gentlemen, to the left," etc.—Weld's Travel

The difference between cost of pack-horse transportation and cost of movements in wheeled vehicles was so great that although the Conestoga wagon is now looked upon as a venerable type of antiquity, it was an improvement over pre-existing appliances scarcely less important than the early railways.

The strong pack-horses of Scotland usually carried 300 pounds with a cart on inferior roads. A horse could haul 500 or 600 pounds. By material improvements in roads the load could be increased to 800 or 1,000. On first rate roads the ordinary load became 1,600 pounds, and on some good roads the strong horse was able to draw more than a ton.

In the spring of 1821 barrels of mackerel cost \$8 a hundred pounds for hauling from Philadelphia to Somerset. The rate from Philadelphia to Pittsburgh was \$11 a hundred, or nearly 70 cents per ton per mile. Previous to 1824, the cost of transporting a ton of merchandise between Buffalo and New York was \$100, time consumed, 20 days.

In 1794 salt sold for \$5 a bushel, iron and steel for 15 and 20 cents a pound in Pittsburgh. In Mississippi before a railway was constructed, it required 5 yoke of oxen to drag 2800 to 3000 pounds over a road 20, 30, or 40 miles into Natchez and Vicksburg. So many perished in the yoke in winter and spring, that it has been said that you might walk on dead oxen from Jackson to Vicksburg.

In the spring of 1865 freights were about 12 cents a pound from Atcheson to Denver, and 15 cents to the mountains beyond.

The first advance in American transportation systems was derived from the construction of turnpikes and bridges by companies whose capital was in some instances derived from state or county subscriptions, and in others, wholly from individuals. The first extensive turnpike in the United States was from Philadelphia to Lancaster, 62 miles and a quarter, capital \$360,000. The act incorporating the Philadelphia and Lancaster turnpike company was approved April 9, 1792, and provided for the levying of tolls.

In 1822 the length of turnpike roads for which charters had been granted was 2,521 miles, of which 1,807 had been completed. Individuals had subscribed to the capital \$1,158,347 and the commonwealth \$1,861,542.

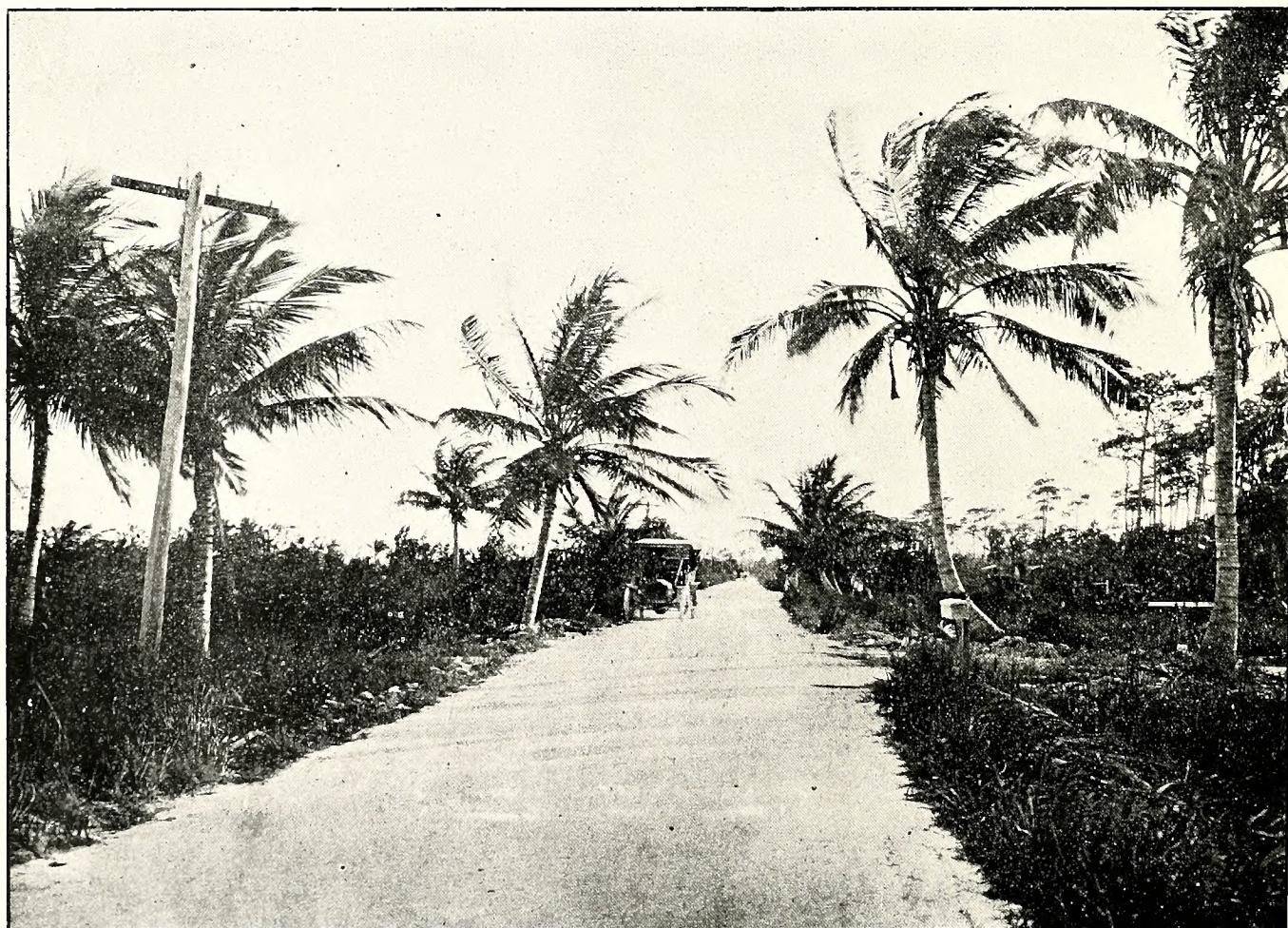
The total cost of the turnpikes was \$6,401,474. In 1828 nearly 2,380 miles of roads had been constructed in Pennsylvania passable at all seasons at an expense of \$8,431,000. None of the turnpikes yielded sufficient dividends to remunerate their proprietors.

"The reduction in the expense of transportation added to the increased value of the land adjacent to the three great turnpikes leading from Philadelphia, Pittsburgh, Erie, and Tioga, and amounted to a sum which at the lowest estimate exceeds the cost of constructing not only these roads but all the turnpikes in the state collectively." (Mr. George W. Smith, 1828.)

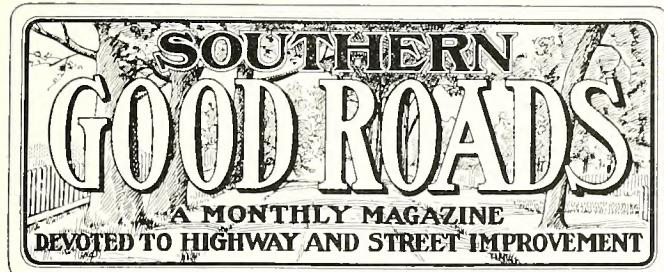
The length of the first line of the old national road was 130 miles and the cost \$1,700,000. The first stage coach bearing U. S. mails passed over it from Cumberland to Wheeling on August 1, 1818.

In constructing turnpikes the U. S. government paid the expense of a few routes, while of many others private companies supplied the means. In some cases they were aided by subscriptions of states to their stock, while other turnpikes were constructed by a combination of the contributions of states and counties. The 350 odd miles between Pittsburgh and Philadelphia were covered in about three days if the roads were in good condition. Every twelve miles a change of horses was made. A through ticket from Pittsburgh to Philadelphia was all the way from \$14 to \$20.

"The charge for the carriage of commodities from Baltimore to Wheeling on the turnpike road averages about two cents per pound, or \$44.80 per ton on the whole distance of 266 miles, being at the rate of about 17 cents per ton per mile."



Beautiful Road Near Cocoanut Grove, Dade County, Florida



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No. 1.

KEEP TO THE RIGHT.

That certain rules and regulations are necessary to govern the use of vehicles on the public roads will probably be admitted by all. While some of these are regulations of custom, there are still others that are laws passed by the General Assembly. Some of the latter were formerly regulations of custom, but, on account of the changes that have taken place both in the character of the road and in the character of the vehicles using the road, they have been made into laws. One of these laws that needs to be given more serious attention than ever before is the one "Keep to the Right." Since the advent of the automobile it is even more necessary than ever before that all users of the road should follow this law and regulation very strictly. As two vehicles of whatever character approach each other on the public road, they should each turn to the right in passing, and there should never be any question at all in the mind of either driver as to which way the other will turn. He should know that he will turn to the right.

If one vehicle comes up behind another and wishes to pass the one ahead, he should know that the front vehicle will turn to the right and the rear vehicle will pass to the left side of the road.

These regulations in regard to passing should be very carefully adhered to by every one using the road, and, if they are, the chances of accidents, especially with automobiles, will be greatly reduced.

At the present time, if one travels over the public road, he will constantly notice that two teams ap-

proaching each other instead of one turning to the right one will start to turn to the left while the other turns to the right, and before they are able to pass one team has very often had to stop. Also, a team approaching another from behind and attempting to pass, leaving the front vehicle on his right, often finds just as he is about to pass that the driver turns in to the left expecting him to have gone on the other side. This has been the cause of many accidents, and is a very serious condition. A traveler must be sure how an approaching vehicle is going to turn, and to know in passing a vehicle from behind that it will not turn into him just as he comes opposite to it.

SENATOR SIMMONS' NATIONAL AID BILL.

Hon. F. M. Simmons, senior senator from North Carolina, introduced in the United States Senate last month a bill providing for an appropriation of one million dollars to aid in the building of roads. The bill sets forth that its primary object is "experimental improvement of rural delivery roads" and charges the secretary of agriculture and the postmaster general with the responsibility of selecting the roads to be improved and of securing the necessary information as to the benefits that would come from such improvement in the way of increased number of patrons on rural routes and cheapening of the service.

On June 23rd, Senator Simmons addressed the Senate and a part of his speech appears in this issue of Southern Good Roads, just as taken from the Congressional Record. It will be noted that a number of prominent senators of both political parties, took great interest in the question, and frequently interrupted the speaker to tell what was being done in their respective states. In fact, the Senate resolved itself into a good roads meeting, and for two hours nothing else was thought of or talked of. The tariff faded away and reciprocity went glimmering. Every senator was glad to get back to something interesting and refreshing and the newspaper reports of the happening say that Senator Simmons was heard attentively by one of the largest audiences that has sat through a long speech this dry, hot, special session.

This is encouraging. When a speech on good roads is accorded the attention that this one received, it cheers the drooping spirits of the good roads cranks of the country, who have been fighting so long and so earnestly for the cause without seeing any sort of evidence of legislative interest or awakening. Now it begins to look like something will be done and we confidently expect to see Senator Simmons' bill become law.

The bill recognizes the principal of self-aid and provides that the state which receives money under this act, must also raise an equal amount for road building. If \$200,000 is to be appropriated to North Carolina, the Old North State must raise another \$200,000. This will undoubtedly be followed by state aid provisions by which the individual counties would secure the benefit of the appropriation. Each county would be required to raise an amount equal to the amount that the state

offered and by the time the fund set aside by the national government gets down to the counties for *actual* work, there would have been raised for road building, assuming that the appropriation from the government was \$200,000, the sum of \$800,000.

An unique feature of the bill is the proposition to place a tax on automobiles doing an inter-state business. There are now half a million automobiles in the United States, and Senator Simmons estimates that one fifth of these, or 100,000, go from state to state. On these he would place a tax of \$10 per year, thereby raising a road fund of \$1,000,000 which would be distributed among the states. The bill makes no definite provision for this tax, but instructs the proper authorities to investigate the subject.

Senator Simmons made a strong appeal for his bill and his speech attracted national attention, and will have large circulation. Senator Bankhead, of Alabama, Senator Swanson, of Virginia, Senator Gallinger, of New Hampshire, and a number of other leaders in the national congress, have introduced bills looking toward the same end as this bill and containing many of

its features. Senator Bankhead's speech on his bill has been widely circulated, more copies of it being asked for than he could supply and Senator Simmons' great address also promises to become a notable addition to good roads literature.

The plan offered in the bill has no weak points. It is sensible, reasonable and feasible. The time has come when federal aid is a necessity and the leading men of the nation so recognize it. Following it will come state aid and there will be real work done in road building all over the nation. The government will find it the part of wisdom to get behind the various movements for great trunk lines of highways, crossing numbers of states, such as the National Highway from New York to Jacksonville, and perfect them, and the lesser projects, such as the Great Central Highway of North Carolina, the Great White Way, of Arkansas, the Gulf Coast Highway of Texas and the Memphis-Bristol Highway of Tennessee, should receive government aid.

Federal aid is coming and with a few more advocates of the Simmons, Swanson, Gallinger and Bankhead class, it will come soon.

The Central Highway--In the Mountains and the Piedmont

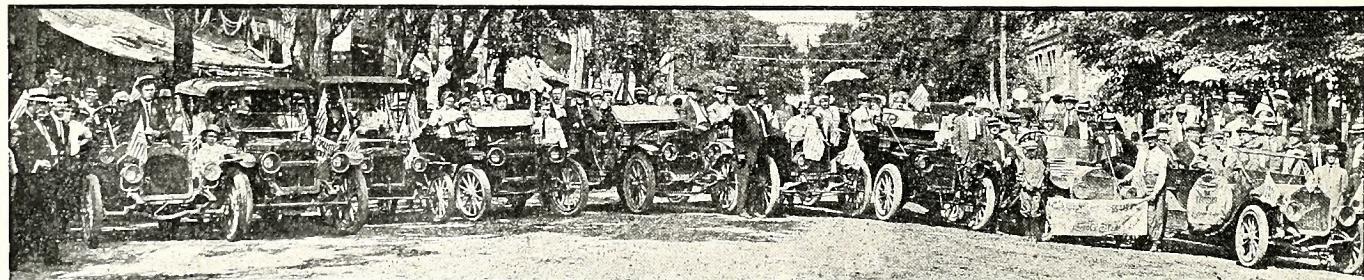
By COL. ROBT. M. PHILLIPS Associate Editor Greensboro (N. C.) Daily News

The scout—or pathfinding—trip of the Central Highway Commission gathered spirit, enthusiasm and dynamic momentum until its close. It covered the entire length of North Carolina from Beaufort harbor to Faint Rock on the Tennessee line, 460 miles. In the June number of this publication my article treated the first lap of the trip—from the ocean to the state capital and told something of what the great Central Highway means to that vast sound and coastal plains region that gradually merges into the gently undulating eastern slopes of the Piedmont region. In this article I am to say something of the prospects and the possibilities for results in the beautiful mountain country, the foothills and the rich and fertile Piedmont plateau, covering—from west to east—the counties of Madison, Buncombe, McDowell, Burke, Catawba, Iredell, Rowan, Davidson, Guilford, Alamance, Orange, Durham and Wake.

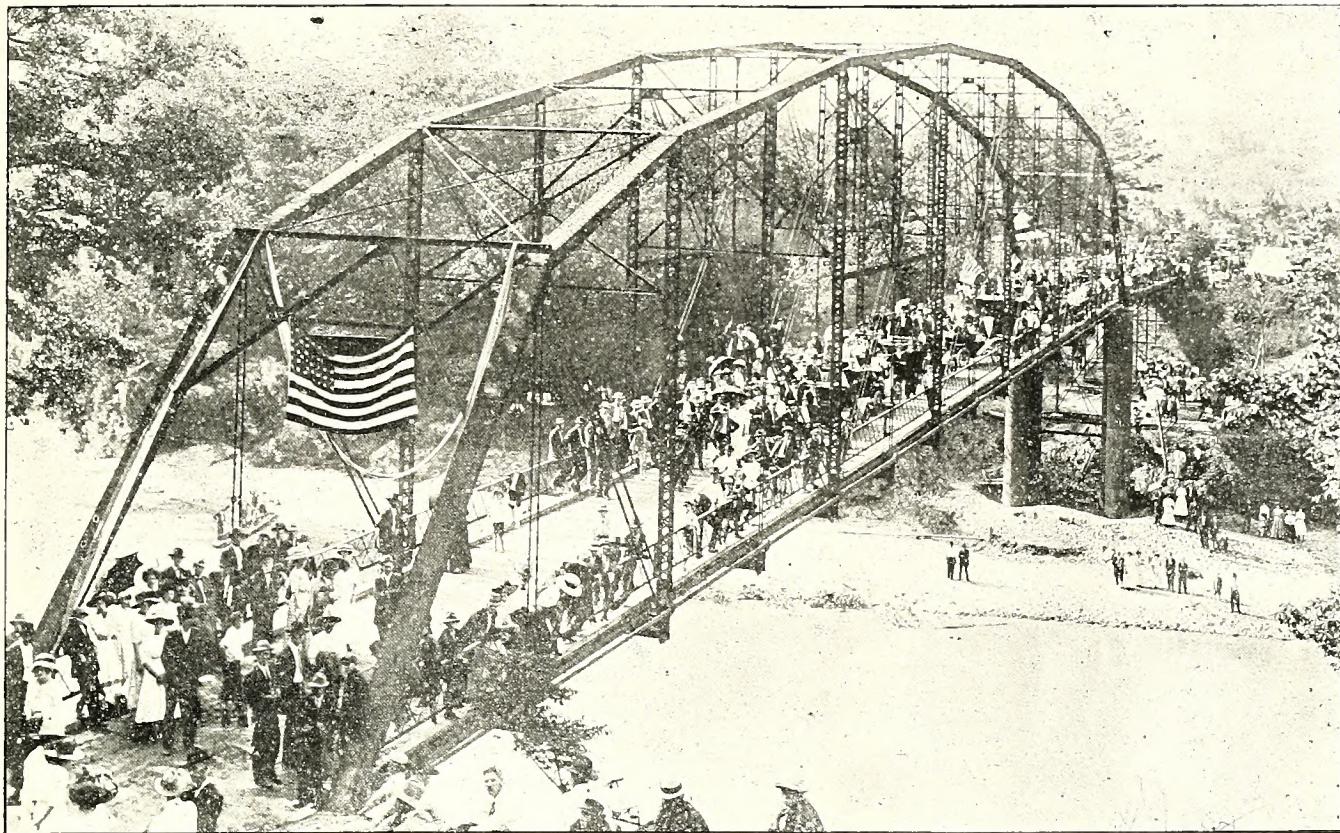
Of course, in an article of this nature, it will not be entirely practical, nor even possible, to deal with the various community problems that exist along the pro-

posed route. They are purely local and must be dealt with and overcome by local effort. Spirited rivalries over the location of the route were encountered; and in some places there was a more or less apparent lukewarm feeling growing out of rural prejudice against automobiles. But on the other hand, among the most intelligent and progressive people, we found tremendous enthusiasm for good roads and a well established and fixed determination that the Central Highway shall be built. In every county there are live progressive men at the helm; and we were everywhere greeted by large crowds of interested men. In many places the good women attested their interest by attending the meetings.

The second lap of the scout trip began in the mountains with two automobiles constituting the traveling equipment of the official party. These were the Case car donated and manned, free of all cost by the J. I. Case Company, and Mr. Wm. Dunn's car. These cars were in charge of H. S. Holcomb and Monroe Howell,



Scene on the streets of Statesville, North Carolina, on the occasion of the visit of the Trustees of the Central Highway, Saturday, June 10, 1911, which is considered the logical highway route and is claimed by the enthusiastic citizens as the best town in North Carolina. This good county of Iredell voted \$400,000 in bonds to build roads—the largest bond issue ever voted in any county in North Carolina for that purpose.



Catawba River Bridge, Near Mooresville, N. C. on the Central Highway. Scene at a Good Roads Meeting, June 9, 1911. Crowd Estimated at Five Thousand

two expert chauffeurs, as capable as any who ever touched a throttle or handled a steering wheel. With less competent men it would have been next to impossible to safely travel the narrow, steep and rock mountain trails in the big machines. So skilful was their guidance and accurate their judgment that not a man was hurt in the slightest degree and not a car laid up for repairs. This much is due the men whose alert watchfulness and skill carried the party through safely and in time for every meeting point; and also to the Case Company and to Mr. Wm. Dunn, whose interest in good roads building prompted them to furnish, absolutely at their own expense, the two large touring cars to make the pathfinders' trip from one end of the state to the other.

On June 5, the scout party resumed the work of mapping out the route for the Central Highway with a meeting at Marshall, in Madison county. In the party were State Geologist Pratt, Chairman H. B. Varner, Trustees Wm. Dunn, of New Bern and Jas. A. Wellons of Smithfield, Col. Fred Olds of Raleigh, Robt. A. Wellons of Smithfield, our two chauffeurs and the writer. We were joined by Dr. C. P. Ambler of Asheville, member of the Central Committee, E. C. Chambers, president of the Buncombe county good roads association and several other Asheville gentlemen. The officials and many members of the Madison county association were present. One of the most deeply interested men in the audience was Col. Rumbough of Hot Springs, who is perhaps the wealthiest citizen of Madison county. When the Madison county trustee of the Central Highway, Thos. J. Murray, spoke the applause that greeted him left no sort of doubt that Madison was aroused. By an almost unanimous vote of a court house filled with the best citizens the commissioners were requested to levy for good roads the maximum tax under the law in Madison county—50 cents on the \$100

valuation and \$1.50 on the poll. By a standing vote test there were only eight men against it.

That night another meeting was held at Hot Springs with a large attendance. A township good roads association was organized there with energetic, strong men at its head. One thing impressed me very forcibly in Madison county—complete harmony. Men have preferences about the route, but above it all is the desire to get the Central Highway through the county. Politics and political jealousies are laid aside and forgotten in the united pursuit of the main question. In Madison they have both Republicans and Democrats in the good roads working forces, and they are working together in unity and complete harmony.

SECTION OF WONDERFUL SCENERY.

It is beyond the ken of mortal man and out of the realm of the finite mind to grasp the full meaning, in actual cash value, of a well graded and smooth macadam road of thirty feet width through Madison county and along the beautiful valley of the French Broad river. I have not traveled beyond the seas; but I have seen the magnificent grandeur of the towering snow covered Canadian Rockies, the Selkirk mountains, the entire western ranges in our own country from Seattle to Los Angeles, the awe-inspiring and freakish grandeur of Nevada and Utah, with the splendid majesty and wild ruggedness of the Rockies in Colorado; but for the most restful and pleasing beauty of mountain scenery commend me to the verdant panorama of Western North Carolina. There the fruition of creation's design reaches its highest perfection.

That part of this veritable paradise to be touched by the Central Highway is typical of the fairest and best of the vast mountain region. The counties of Madison, Buncombe and McDowell are among the most favored in natural beauty. While Buncombe has been building good roads and has made notable progress, the other

counties are yet among the shut-ins so far as rural transportation is concerned. They have millions of wealth lying dormant in climate, scenery and pure water. As Judge Carter said in his speech at Hot Springs, "to find purer water one would have to meet the Rainmaker in the skies and catch the sparkling liquid before it touches the earth."

Most assuredly Madison county has material wealth in rich soil and splendid farms; but they are but suggestive of the revelation that will come with good roads. The advent of the Central Highway will be the first step toward capitalization of that county's climate and scenery. Health and pleasure and wealth is there for thousands who would be glad to go in and possess it; but without roads they can't get in, and if perchance they get in, they squeeze out again because of lack of rural transportation facilities. The railroad hugs the banks of the French Broad and the tourist does not stop because he cannot get away from those banks, and to get out he must go on through or go back the way he came. The work that is going on in Buncombe and that is taking shape in Madison and McDowell will

Central Highway through Madison will be a monument to the progressive energy and grit of those sturdy mountain people; and rich will be their reward.

Buncombe county has tasted the sweets of improved roads and the movement cannot be checked there. That county will continue in front of the procession. A good road now in service from Asheville to the top of the Blue Ridge at Swannanoa Gap on the McDowell county line, will be a part of the Central Highway. This road leads through Black Mountain township—the first township in the state to vote bonds to build roads. From the Swannanoa Gap down the eastern slope of the mountain to Old Fort presents a problem of engineering and construction that is equalled nowhere else on the route, so great is the descent. At the foot of the mountain a large delegation of men of that section awaited the scout party. Following the meeting at Old Fort a good roads association was organized, and the determination was expressed to begin practical work right away. A few miles further down, where a new steel bridge had just been completed across Catawba river, more than one hundred



Girls Booster Club that greeted the Central Highway Trustees on their visit to Mooresville, June 9th. These Boosters are Good Roads Girls, and with their influence and activity, a million dollar bond issue could be carried in any county in the State. Back row: Clara Mills, Lucy Culbertson, Gay Kennett, Eloise Hawthorne, Ruth Brawley. Second Row: Carey Wilson, Nadine Brawley, Rose Kennedy, Annie Mills, Audrey Kennett, Reba Brawley. Third Row: Marguerite Brawley, Elizabeth Rankin

change all this, and the section that has been called the "Switzerland of America" is coming into its own. Those mountains have stood there for centuries in unsurpassed grandeur while millions of people have gone through the world and out into the mystic beyond without feasting their eyes upon the wonderful beauties that lie just a few miles away. Few eyes have beheld the mountain side and gorge and canyon filled with blooming rhododendron and laurel, and enjoyed the other scenic attractions that are ample to feast millions of eyes.

The people who own and inhabit this lovely garden of grandeur are waking up to the possibilities that lie dormant about them. Nature spent herself for them with lavish hands, and the people are beginning to see that it is but necessary for them to build roads to the harvest fields. Few sections are so abnormally blessed with native resources and advantages. The men of Madison have made a start and they are not the type of men to turn back. They declare they are determined to meet Buncombe in the good roads movement on the east and put it up to Tennessee on the west. The

farmers were in waiting to receive us and cheer the Central Highway movement. These men had left their plows in the fields and came from one to seven or eight miles to meet the scouts and prove their interest. At Marion that night a large and enthusiastic meeting was held, and we were given assurance that McDowell will do her part, which is a large one, owing to the steep mountain grade west of Old Fort. The cheering news comes in a letter from Mr. W. T. Morgan of Marion, a member of the central committee, at this writing, two weeks later: "Interest is still growing, and our organization is constantly increasing."

The next county, Burke, is still somewhat mountainous, sloping into the foothills, and is a fine section of the state. The people there want the Central Highway and have organized to build their part of it.

THE PIEDMONT FARMING SECTION.

Through Burke, Catawba and Iredell the scout party passed through a marvelously rich and fertile farming region, where good roads are a crying need and must be built if development is to come. That they

will be built every assurance is given. Iredell has set the pace by voting to issue \$400,000 of good roads bonds. The sentiment is not so pronounced in Burke and Catawba, but live organizations have been formed to push the Central Highway project. With that road built the problem will be solved and the work will continue. These counties are abundantly able to keep pace with Iredell, they have rich agricultural lands and no finer crops of wheat were seen anywhere than in Catawba county. But the roads at present are of dirt, not well drained, and hence not in the class of good roads. The progressive spirit is catching there, however, and I believe Catawba will soon give evidence of a determination to get in the front of this movement and stay there. The same is true of Burke.

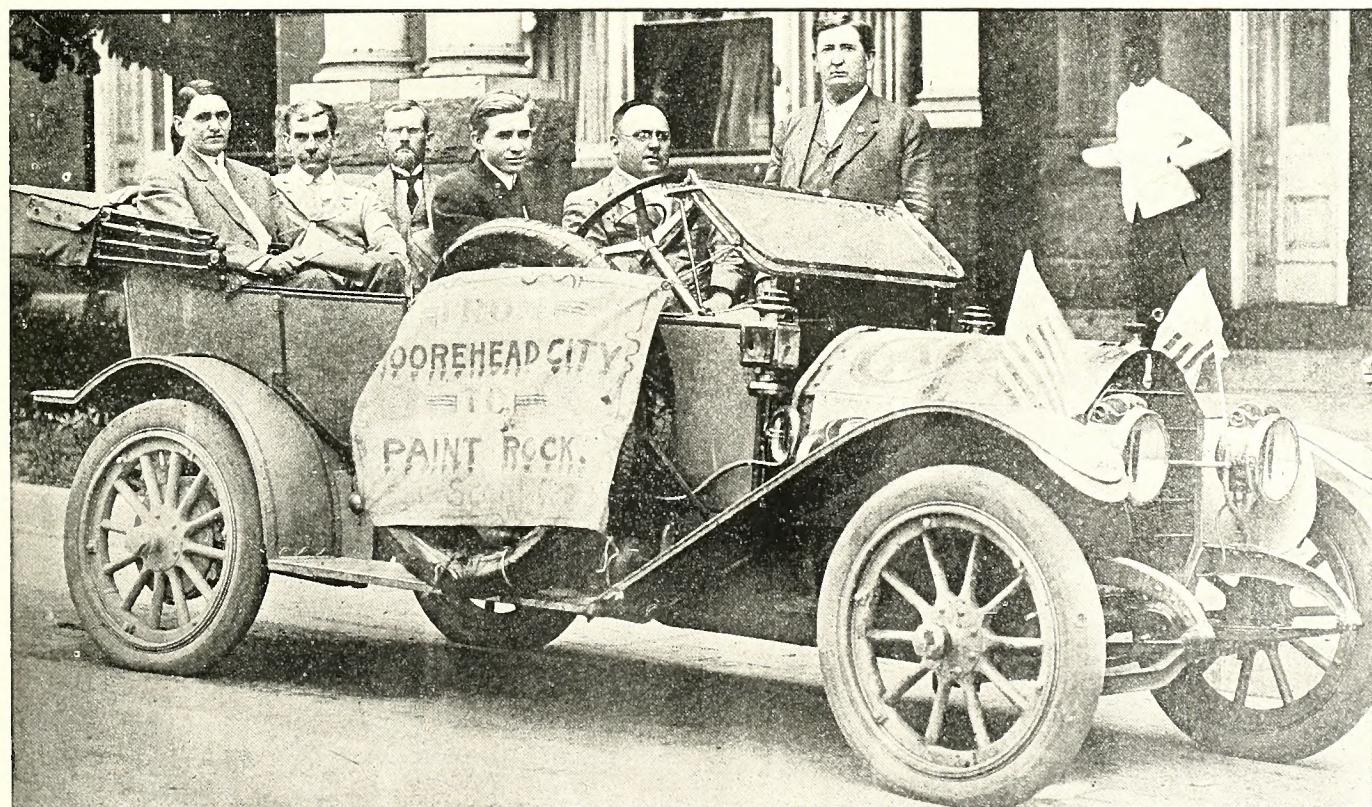
In Iredell county the scout party found everybody feeling good. They did not need our services, in a missionary sense; but they were glad to see us and gave us royal welcome. We entered the county from Catawba over the new steel bridge, and a quick run over a macadam road brought us to Mooresville. No brighter spot has been found in all the state than Mooresville. Not only the men and boys, but the women, old and young, were cheering for the Central Highway. They have there a booster club of young ladies, and such a medley of beauty and enthusiasm I have never before witnessed. They sang good roads songs and gave good roads yells with a spirit and with compelling energy. As I ruminated about it I said "No wonder Iredell voted \$400,000 for roads, they could have made it a million with such a force as that behind it."

After a night in Mooresville—a season of jollification over the victory—we passed the next morning to Statesville for another celebration. Here we were given the glad hand again, and just as we had found that the "way everywhere is by Mooresville," we found that by Statesville was "the logical highway route."

Here I ruminated again and I said "It is worth all the hardships and fatigue it costs in fighting for good roads to reach a county like Iredell and commune with the happy people who have won such a victory over mud and impassable roads." We were entertained in royal style, and there was little for the scouts to do but utter a few words of congratulations and to feel good. Iredell is on, and will virtually have a "central highway" all over the county.

Rowan is in fine shape and is still building roads, ready to meet any other county anywhere at the county line with a good road. Davidson held a fine meeting, is well organized and will furnish a good link in the ocean to mountain highway. Guilford is ready for the adjoining counties to join her roads, and is still doing construction work. Alamance is alive and ready to do her part. Orange is waking up and has organized for business. Word comes to me that her red hills, including other difficulties, will be overcome. Durham only awaits the word to connect, and Wake will join to Durham and Johnston, thus completing a continuous ocean to mountain great Central Highway.

One of the liveliest organizations in the state of Texas, is the Gulf Coast Good Roads Association with headquarters at Galveston. Col. J. H. Hawley, who is a well known good roads enthusiast, is secretary of the organization and spends a large per cent of his time going from place to place advocating the voting of bonds for the purpose of building good roads. A good road from Port Arthur to Galveston is one of the plans of the Association and as a result of their efforts Liberty county has just issued bonds to the amount of \$500,000 to build their part of the highway. The Association is also interested in the question of a Red River to the Gulf Highway and is giving a stimulus to road building activity in all parts of the state.



The Case Scout Car with the Trustees on the final windup of the preliminary tour of the Central Highway in Raleigh, North Carolina, June 17th, after being on the road for three weeks traveling about 500 miles, organizing every foot of the territory of the Central Highway, conducting from one to six meetings a day with crowds ranging from 100 to 5,000 people.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

Capt. John Craft of Mobile, president of the Alabama Good Roads Association, writes as follows:

"In reference to the proposed highway, it is suggested to have a first-class road running from Jefferson county, in Birmingham, through the counties of Bibb, Chilton, Autauga, Elmore and Montgomery, connecting with the capital of the state. My idea is to have the counties to agree to have the parties who are authorized by law to authorize the construction of a standard grade highway, with the grades made easy and the approaches, culverts and bridges to be of a permanent structure; also to provide a maintenance clause. I believe the direct results of this idea to have the six counties join in, if carried out with State aid and State supervision, will be an incentive to rouse the balance of the counties in the state to continue this road so it will radiate over into every county-seat in the state."

* * *

Arkansas.

Traversing the state of Arkansas from the Missouri line and on into Oklahoma, opening up the backwoods regions to the progress of civilization, a great highway is being constructed by popular subscription. It is to be called "The Great White Way," and will be macadamized with stone the entire distance. On each side trees will be painted white for a distance of ten feet from the ground to serve as a guide for the traveler. At intersecting roads full information will be placarded.

In all parts of Arkansas men women and children have turned out to do actual work on the road and it is being built without one cent of expense to the counties or to the state. It will be fifty feet wide and there will not be a grade over four per cent along its entire length of more than 100 miles. A good roads day will be named soon and everybody will get down to work. The road has been divided into 65 divisions, under as many captains, and each captain has a crew of his own. Prizes will be offered for the most effective work done and will be open to all of the crews.

* * *

Georgia.

Georgia and Alabama united in their good roads enthusiasm Thursday June 8, at LaGrange. Alabama's primary purpose in this peaceful invasion of Georgia was to study Georgia's good road methods in Troup county, which ranks high in its practice of those methods. The secondary purpose of this meeting was a joint one. It was to launch a movement for a co-ordinated highway through this section of the two states with Atlanta as one terminus and New Orleans in view as the other.

Some 30 cars laden with Alabama motorists, county commissioners and city authorities crossed the state line at West Point. They came from Opelika, Lafayette and Tuskegee and other points in Lee, Chambers and Macon counties, Ala.

Six cars from LaGrange meet the Alabamians at West Point and escorted them to LaGrange.

The meeting in LaGrange was a very enthusiastic one and was productive of good results. Alabama and Georgia are heartily in favor of the New Orleans-Atlanta Highway and will build their parts of it cheer-

fully. New Orleans will probably take an active interest in the project and there is every reason to believe that the road will be built.

Troup county, in which the meeting was held, is a live wire in the road building business. This county has been working convicts since the felons were put on the public roads of Georgia. She now has 47 men at work, representing Gilmer and Dade counties' share as well as her own. Competent civil engineers under the direction of Solomon & Noreross, of Atlanta, have constant supervision over the work. A bond issue of \$200,000 was voted a year ago, and is being expended on the best of bridges and culverts and other road construction.

The county commission, composed of five public spirited men, is a unit for good roads and the people of Troup county stand behind them.

* * *

Kansas.

Kansas is to have one good road, at least. Seven counties have combined to build a north-and-south highway from Wellington, in Sumner county, to Belleville, in Republic county. A conference was held at Salina last month and an organization started. W. S. Gearhart, state highway engineer at the Kansas State Agricultural college, attended the meeting and addressed the delegates. The highway is to be called the Meridian Road.

* * *

Kentucky.

The work of preparing for good roads' week on the "Lincoln Road," Kentucky's great State Highway, is proceeding in such a systematic manner that by the time the first of August rolls around those in charge expect to have every detail arranged. So much into detail have they gone that in every county seat a section boss, so-called, has been appointed, who has under him a man for every mile of road in that county.

These sections crews will have delivered to them exactly the necessary quantity of stone, the proper number of wagons, teams, etc., with which to successfully do the work. They also will know how many culverts they will have and how many feet of pike to build. By the end of the week, therefore, working in this way, it is expected that wonders will have been accomplished.

* * *

Ohio.

In Ohio 30 counties have voted \$2,500,000 bonds for good roads constructing this year and will spend in addition half a million from state revenues. The people of the Buckeye State are wide-awake on the good roads question and the three millions which will be spent this summer is not a "marker" to what will be done next season.

* * *

Pennsylvania.

The far-famed Sproul Good Roads Bill became law in Pennsylvania Wednesday, June 7th, when Governor Tener affixed his signature to it. E. M. Bigelow, an experienced engineer, was named as highway commissioner.

The Sproul bill reorganized the State Highway Department, providing for a commissioner at \$8,000 a

year, with two deputy commissioners at \$6,000 a year; a chief engineer at \$7,000, district engineers and other officers and attaches and for the construction of a system of main highways to reach every part of the state. Two hundred and ninety-six routes are outlined.

The bill carries an appropriation of \$3,000,000 for the construction of main highways and the maintenance of the department and \$1,000,000 for the continuance of state aid to counties, boroughs and townships in road building.

By the enactment of this law Pennsylvania is given a road building program covering every county and provision is made for the construction of one of the most comprehensive road systems in the country.

* * *

South Carolina.

While the majority of the counties of South Carolina have shown great interest in the good roads movement, it is a fact that the larger number of those interested have allowed themselves to be contented with mere talk. It may result in something worth while some time, but there is little road work going on now. Sumter county affords a refreshing contrast in that it has already issued bonds for \$50,000 for road building and is preparing to follow this up with \$150,000 more. A red-hot campaign for the necessary bond issue is now being carried on and there is every prospect that bonds will be voted. This amount will give Sumter a system of sand-clay roads, second to none in the state and will place that good county among the leaders.

* * *

Tennessee.

In preparation for an active campaign for improved roads throughout Tennessee, the Memphis-to-Bristol Highway Association has become affiliated with the American Association for Highway Improvement at Washington. The association in Washington which has been assisting the work of all road improvement organizations in the country has agreed to send its organizers and orators into Tennessee to aid the Memphis-to-Bristol Highway Association in its work. Arrangements are being made for big meeting to be held in Nashville and other cities along the route, August 13th and 14th, when representatives of the American Association for Highway Improvement and experts sent by the government will make addresses on the subject of road improvement and maintenance. All the information in the possession of the association in Washington has been placed at the disposal of the affiliated concern so that the campaign for improved roads in Tennessee may be thoroughly systematized.

The Memphis-to-Bristol Highway Association has planned to make a record on August 12, 14, thirty-two thousand men having pledged themselves to work on the road between Memphis and Bristol on those two days. Six thousand teams have been pledged for the work. It is probable that J. E. Pennybacker, Jr., secretary of the American Association for Highway Improvement will represent that organization at the Tennessee meetings and Paul D. Sargent, assistant director of the United States office of public roads will represent the government.

Various road improvement associations of Tennessee have announced that immediately following the good road days in Tennessee they will join with the Memphis-to-Bristol Highway Association for a general state-wide crusade for a complete system of improved roads.

* * *

Texas.

Seventy-two miles of country roads, distributed throughout the entire county, are to be paved by Har-

ris county, Tex., with shell and gravel within the next twelve months out of a recent road and bridge bond issue of \$500,000, according to a schedule adopted by the county commissioner's court. In the list of the roads to be paved are a number of the most important highways in the county, one of which is the Webster Air Line road, running from Harrisburg to the county line, a distance of eighteen miles, where it will connect with a paved road to be constructed by Galveston county, thereby giving a complete paved road way from Houston to Galveston.

* * *

Virginia.

The people of Virginia are looking forward to the second annual meeting of the American Association for Highway Improvement which is to be held in Richmond October 30th, 31st and November 1. This meeting was to have been held September 12-15, but the change in time was made after consultation of the leading members of the organization. The meeting promises to be the greatest good roads meeting ever held in the Southern states, or in the entire nation, for that matter. It will bring to Richmond thousands of visitors and will help along the good roads cause wonderfully in the Old Dominion.

According to reports sent out from the offices of the state highway commission, a great deal of bridge and culvert building is going on in Virginia. A number of counties are preparing to spend large sums on roads, notably Wise county, where contracts were let on June 28 for grading eighty-one (81) miles of road. This county has employed Mr. W. F. Cocke a competent highway engineer, to superintend the work, and it will be done according to his specifications. All of this road, after it is graded, will be surfaced, the greater part of it with macadam. The grading is unusually heavy for highway work, averaging 8,000 cubic yards per mile.

* * *

Wisconsin.

The state of Wisconsin is the latest addition to the ranks of the progressive state-aid-for-roads states. The bill passed last month, after a hard fight, and is now law.

This bill provides for the expenditure of \$350,000 annually on good road building throughout the state, not more than one-third of which will be provided by the state, the balance coming equally from the counties and the townships in which the roads are built. A commission of five, consisting of the dean of the engineering college, the state geologist and three men selected by the governor, will have charge of the work.

Through the supervision of this commission and its engineers the work of building good roads will speedily be given a decided impetus. Under the new arrangement a million dollars a year will be put into road building in an expert manner and superintended with thoughtful regard for economy and good quality.

Robertson county, Tenn., is asking for bids on the construction of a macadam road 50 miles long, 40 feet wide and with stone 8 inches deep. \$150,000 is available for the work.

Mr. Arthur H. Blanchard, M. Am. Soc. C. E., Consulting Highway Engineer, has resigned from the position of Associate Professor of Civil Engineering at Brown University to accept the appointment of Professor of Highway Engineering at Columbia University. Mr. Blanchard will have charge of the graduate courses in Highway Engineering which will be established at Columbia University next year.

GOOD ROADS NOTES IN BRIEF

The Dayton district of Liberty county, Tex., voted last month a bond issue of \$250,000 for the building of shell roads. Few roads equal the shell roads and where the material is available within easy reach, as in Liberty county, they are much cheaper than macadam.

Cabell county, W. Va., voted \$30,000 in June as a starter in the building of good roads in that county.

In McLennan county, Tex., precinct No. 5 has voted a bond issue of \$100,000 for good roads.

In Hay county, Tex., the first road district has been forced under the law and a bond issue of \$20,000 voted.

Morganton, W. Va., is planning to spend \$100,000 for street improvement.

Gregg county, Tex., will vote this month on a bond issue of \$200,000 for general road work.

Fort Bend county, Tex., is to start road improvement with a bond issue of \$75,000.

The county commissioners of Lowndes county, Ga., are to issue bonds for \$200,000 for road work.

McLennan county, Tex., has a campaign on foot for a bond issue of \$600,000 for road building.

The city of Grant Parish, La., has awarded contracts for the building of 32 miles of roads and streets at a cost of about \$58,000.

Oklahoma City, Okla., has awarded contracts for paving amounting to \$250,000.

At Waynesville, N. C., a contract has been let for the building of five miles of sand clay boulevard around the lake of the Southern Methodists' Assembly grounds.

The city of Elberton, Ga., will spend \$30,000 for street improvements.

In Carteret county, N. C., the Central Highway Company, is asking for bids for the construction of a road from Morehead City to the Craven county line, this being Carteret's link in the great Central Highway which is to stretch from the sea to the Tennessee line.

The state of Missouri is planning the construction of a road across the state 300 miles long.

The city of Charlotte, N. C., voted July 3 on a bond issue of \$815,000 for street and other improvements. The bonds carried by a very large majority.

The people of Mars Hill, Madison county, N. C., objected to being left off of the Great Central Highway that is to be built from the Atlantic to the Tennessee line, and went to work to turn things their way. They have announced that they have \$10,000 in cold cash in sight for the building of the road and ask that their claims receive the consideration that they deserve. It is now more than probable that the highway will be routed this way.

In Indiana there is a law against hauling a load weighing over a ton in a narrow tired wagon on wet roads and in Kentucky there is a distinction made in toll rates in favor of a wide tired wagon.

Country districts have been depopulated because there were no sufficient roads to reach the cities. There was lure enough in the cities to take the people away over poor roads but not enough in the country to bring them back through mud and over the hills.

Experiments in Utah prove that a given load on a $1\frac{1}{2}$ inch tire draws 40 per cent heavier than on a 3-inch tire, the draft being on a fairly stiff grass sod. On a moist, but hard road, the $1\frac{1}{2}$ tire drew 12.7 per cent heavier than the 3-inch.

Fort Bend county, Tex., has voted bonds for \$75,000 for the building of that county's section of the Gulf Coast Highway.

The Inter-mountain Good Roads Association, com-

posed of representatives from the states of Utah, Montana, Idaho, Wyoming, Colorado and Nevada, met in Pocatello, Idaho, last month. About 200 delegates were present. The association will meet next year in Logan, Utah.

Childress county, Tex., is preparing for a good roads campaign. The amount of the bond issue to be voted on has not been decided on.

Washington county, Tex., is in the midst of a fight for the issuance of bonds for \$300,000 for good roads.

A good roads club has been organized at Franklin for the purpose of building the Robertson County (Tex.) link of the Red River to the Gulf highway.

The city of Jacksonville, Fla., has awarded contracts for street paving amounting to \$101,150.

Galveston county, Tex., has let a contract for five miles of road to cost \$28,500.

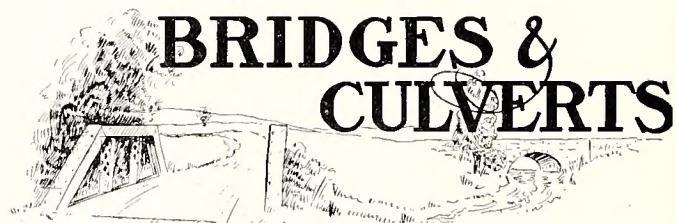
Main street in Chattanooga, Tenn., is to be paved at a cost of \$667,000.

Memphis, Tenn., is preparing to spend \$17,000 in paving Union avenue with creosoted wood blocks.

The good roads advocates in Georgia are jubilant over the fact that their state spent during the fiscal year ending May 31, 1911, the sum of \$3,000,000 for good roads.

Greenville county, South Carolina, has purchased for \$3000 a gasoline traction engine which it is estimated will do the work of 20 mules in road improvement at about one-fifth the cost of the mules.

In Boone township, Davidson county, N. C., \$1,000 has been raised by private subscription for the building of the Central Highway. Tyro, an adjoining township has announced that it will raise a dollar for every dollar that the county will appropriate for the same purpose and other townships are following suit. The county commissioners have already appropriated \$50 per mile for every mile of the highway in Davidson county, which amounts to \$1400.



At Tampa, Fla., the Hillsborough county commissioners, are to issue bonds soon for the erection of a bridge across Hillsborough river. It will cost \$190,000.

At Fort Smith, Ark., the county commissioners have appropriated \$10,000 for the building of a free bridge across the Plateau river.

A contract has been let for the construction of a concrete bridge over Bear Grass Creek at Louisville, Ky., to cost \$12,000.

Lauderdale county, Tenn., is preparing to build 68 steel bridges to take the place of bridges destroyed by a recent flood.

McIntosh and Glynn counties, Ga., are planning to erect a bridge across the Altamaha river which will cost \$30,000.

Jefferson and Hardin counties, Ky., will bridge Salt river at a cost of about \$60,000.

A bridge is to be built across the Potomac river at Cumberland, Md., to cost \$100,000.

Wake county, N. C., will build 105 foot bridge across the Neuse river.

Leflore county, Miss., will build a steel drawbridge across the Tallahatchie river to cost in the neighborhood of \$15,000.

Dallas county, Tex., will vote July 24 on a bond issue of \$500,000 for roads and bridges.

Arkansas county, Ark., announces that it will build a dozen steel bridges this summer.

Phillips county, Ark., has been asking for bids on two large steel bridges.

Duval county, Fla., is planning to build several bridges around Jacksonville.

The commissioners of De Soto county, Miss., contemplate the issuance of \$25,000 of bonds for bridge construction.

A bridge is to be built across the Red River at Shreveport, La., with two 400 foot spans and 1450 feet of steel approaches. It will cost about \$220,000 and bids will be asked for the work soon.

The city of Meridian, Miss., is planning to build a viaduct on Twenty-fifth avenue at a cost of \$150,000.

The city of Independence, Mo., defeated a bond issue of \$40,000 for building bridges and culverts.

Bates county, Mo., will build four steel bridges across a canal that passes through the county.

Proceedings of the North Carolina Good Roads Association

The Annual Convention of the North Carolina Good Roads Association was held in Winston-Salem on Tuesday and Wednesday, June 13 and 14, and was the most successful in the history of the organization. There were registered 141 delegates, representing the following 36 counties: Alamance, Anson, Beaufort, Buncombe, Cabarrus, Carteret, Chatham, Columbus, Craven, Davidson, Davie, Durham, Edgecombe, Forsythe, Guilford, Halifax, Henderson, Iredell, Jackson, Johnston, Jones, McDowell, Montgomery, Moore, Northampton, Pender, Pitt, Orange, Rowan, Stokes, Surry, Vance, Wayne, Wilkes, Wilson, Yadkin. As will be seen from the above list of counties, the personnel of the convention included delegates from every section of North Carolina from the mountains to the sea coast.

The arrangement for the convention was made by the Winston-Salem Board of Trade, who appointed the following entertainment committee of Winston men: M. H. Willis, Chairman; W. N. Reynolds, P. H. Hanes, Jas. A. Gray, Jr., H. R. Starbuck, S. E. Hall, Chas. M. Norfleet, W. T. Brown, C. A. Reynolds, C. B. Watson, Chas. M. Taylor, Dr. C. L. Summers, Powell Gilmer, J. K. Norfleet, W. Reade Johnson, Alonzo Bagby, C. L. Carroll, H. B. Gunter, T. R. Masten, H. B. Marsh, W. C. Northrup, Sam F. Raper, L. G. Shafer, Fred Sheetz.

The Association is very much indebted to these gentlemen for arranging details of the Convention for its business sessions, and also for automobiles for use of the delegates in looking over Forsythe county roads.

Morning Session, Tuesday, June 13

The Convention was called to order by its president, Mr. John L. Patterson, of Roanoke Rapids, at 10 o'clock. An opening prayer was offered by Rev. H. A. Brown, of Winston-Salem. The president then introduced the Hon. R. I. Dalton, Mayor of Winston-Salem, who welcomed the delegates in a few well chosen words, and Mr. J. A. Wellons, of Smithfield, trustee of the Central Highway for Johnston county, responded appropriately. Mr. John L. Patterson, president of the Association, then delivered his address as president, which was well received and full of good things.

The report of the secretary, Mr. Joseph Hyde Pratt, was then read, which gave a brief review of the work of the Association since its organization ten years ago, and more especially its work during the past year. The attendance at the annual meet-

ings has grown from three to three hundred. He spoke especially of the great aid the North Carolina Press has rendered in advancing the cause of good roads in the State and in educating public sentiment in favor of them. This sentiment is being increased all the time by good roads speeches, by circulars sent out by the Association, in cooperation with the State Survey, and by the newspapers. There are 37 County Good Roads Associations as well as a number of Township Associations. He agreed with President Patterson relative to the method of presenting good roads matters to the Legislature. The secretary thought that ninety per cent. of the counties would have good roads associations before the present year is over.

Mr. Joseph G. Brown, of Raleigh, treasurer, was unable to be present, but his report was read by Mr. Pratt, and adopted. It showed a balance on hand on June 1st of sixty-eight dollars and forty-four cents (\$68.44.) Since the organization was formed the total receipts have aggregated one thousand and fifty-two dollars (\$1,052), disbursements has aggregated nine hundred and eighty-four dollars and sixteen cents (\$984.16), leaving a balance of sixty-eight dollars and forty-four cents (\$68.44). This report stood approved. Next in order on the program was the appointment of committees, and the following were appointed.

Resolution Committee: H. B. Varner, chairman; R. R. Cotton, Fred N. Tate, W. F. Horner, W. A. Graham, J. H. Pratt, A. H. Boyden.

Membership Committee: F. W. Thomas, chairman; S. H. Webb, Jas. H. Atwater, P. B. Beard.

Nominating Committee: C. E. Foy, chairman; J. A. Wellons, Judge H. R. Starbuck, W. M. Saunders, David White.

The entire Association regretted very much that Senator Lee S. Overman was unable to be present and address the Convention.

The roll call of county good roads Associations was the next number on the program, and there were quite a number who made reports for the various counties.

Responding to the roll call many told of the splendid results obtained by building good roads, how nice residences were seen in the rural sections where good roads had been built, model farms, and property greatly increased in value. Others told of suppressed prosperity because of their bad roads and of

how their natural resources were undeveloped as a result of having no outlets.

Afternoon Session, Tuesday, June 13.

First on the program of the afternoon session was an address by Congressman John H. Small, of the First District. Besides the delegates, there were a number of the citizens of the town to hear this far-famed good roads enthusiast as well as waterway specialist expound the doctrine of better roads. In a few well chosen words President Patterson presented Mr. Small, who declared that he had found some people up here who had expressed surprise that he should have come all the way from Washington to be present at a good roads meeting, but he declared that there was no more important gathering that could claim his services and no cause to which he would give his efforts more cheerfully. Mr. Small's speech, in its entirety, will be given in this magazine next month.

Immediately following the address of Congressman Small, President Patterson presented the Hon. M. L. Shipman, Commissioner of Labor and Printing, who read an interesting paper on "Unity of Purpose in Road Construction."

The next number on the program was the report

that \$20,000 well spent would put the highway in shape so that automobiles could without trouble make the trip direct from Raleigh to Savannah. Mr. Tufts asked that action be taken also towards the securing of park lands along the route of highways, stating that within a few years the lands would increase in value so that purchase later on would be at most prohibitive prices.

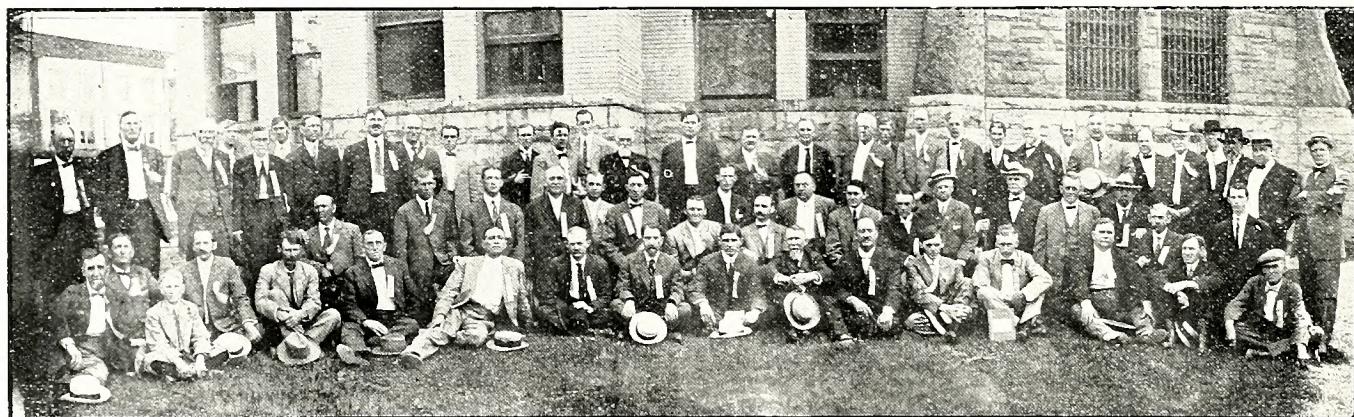
A telegram was received from President A. J. McKinnon giving assurance that the Charlotte-Wilmington Highway would be built.

Morning Session, Wednesday, June 14

The morning session of the second day of the Convention was preceded by a tour of inspection over Forsyth county roads and a review of a demonstration of "Tarvia," by the Barrett Company, of Philadelphia.

The opening prayer was made by Dr. Neal Anderson, of the First Presbyterian church, Winston-Salem, and the first paper was by Mr. Charles H. Moorefield of the U. S. Office of Public Roads and the American Association for Highway Improvement, on "Sand-Clay Roads" which will be published in Southern Good Roads next month.

Mr. P. D. Gold, Jr., of Raleigh, who was scheduled



A part of the delegates who attended the North Carolina Good Roads Association at Winston-Salem, June 13th and 14th, 1911

upon State Highways, and some exceedingly interesting reports were made. President Varner, of the Central Highway Committee, declared this the biggest undertaking ever entered into by North Carolina, but he predicted that the great enterprise could be completed, and that we would soon have a road running through 19 counties, a total distance of 460 miles.

Most encouraging reports were received from President Fred N. Tate, of the Triangular Highway running from Winston-Salem to Pinehurst, via High Point. Mr. Tate pointed out that work had been progressing well and that really the completion of the highway awaited only the construction of a short strip of road across a part of Davidson County and of the entire stretch across Randolph county. He complimented Forsyth county on having fulfilled the requirements finely.

Mr. Joseph Hyde Pratt spoke for the Crest of the Blue Ridge Highway and stated that the Crest of the Blue Ridge Highway would extend 100 miles from Blowing Rock to Asheville, and that the grade would not exceed 4 1-3 per cent.

Mr. Leonard Tufts spoke for the Capital to Capital Route, connecting Richmond, Raleigh, Columbia, Augusta, and Savannah. He made an estimate

for an address on "State Security for County Bonds," was unable to be present, but his paper was read by Mr. Pratt, and was greatly enjoyed. It was decided to publish Mr. Gold's paper under the auspices of the Association and circulate it widely over the State. Col. A. H. Boyden, of Salisbury, declared this to be the most important paper that had been delivered before the Association.

A telegram was then received from Mr. J. H. Brodie, chairman of the Good Roads Committee of the Henderson Chamber of Commerce, inviting the Association to hold its next meeting at Henderson. The Executive Committee, however, will decide on the next meeting place at a later date.

An invitation was extended to the delegates by Mr. F. H. Fries, president of the Wachovia Bank and Trust Company to visit their new bank building.

A new feature inaugurated at this convention, and one which proved a great success, was the "Question Box." Any delegate wishing to ask any question relating to good roads problem in which he was interested was requested to hand his question to the Secretary or place them in a box on the Secretary's desk. The questions were then answered and discussed in open meeting. The answers to the questions was begun in the morning session and extended

ed into the afternoon session. The discussion of these questions was conducted by Mr. W. L. Spoon, formerly Highway Engineer of the North Carolina Geological and Economic Survey, but now Highway Engineer for Forsyth county; Joseph Hyde Pratt, State Geologist, C. H. Moorfield of the U. S. office of Public Roads; A. H. Boyden, Mr. H. B. Varner, editor of Southern Good Roads.

The final address of the morning session was made by Mr. A. G. Batchelder, of the American Organization of Automobilists, New York, who made an excellent address which was greatly enjoyed. The speaker proposed an automobile association for the State, which met with the approval of the delegates. He also thought that repairs should be made on good roads after they are constructed and that road building should be kept out of politics. He is of the opinion that country people will soon become owners of motor driven vehicles as in the end they are a matter of economy. He reviewed the work that has been done in securing good roads in various sections, and favored Federal aid in road building. He spoke very enthusiastically of the Crest of the Blue Ridge Highway now in construction, and declared that it would bring thousands of visitors to this State who now go abroad. Mr. Batchelder is an entertaining speaker and thoroughly acquainted with the good roads problem, and his address was made all the more enjoyable by the strain of delightful humor permeating his remarks. The paper will be published in full in another issue of Southern Good Roads.

Afternoon Session, Wednesday, 2.30

The answers to the questions of the "Question Box" started at the morning session were continued. This was one of the features of the Convention, a number of addresses having been eliminated so that more practical work of a definite nature might be accomplished through this "Question Box."

This was followed by an address by the Hon. C. E. Foy, president of the North Carolina Association of County Commissioners, who delivered a very strong and interesting speech, which the readers of Southern Good Roads will have the pleasure of reading later.

His speech was followed by the report of the committees.

Resolutions Adopted.

The following resolutions were read by Mr. H. B. Varner, chairman of the Committee on Resolutions, and on motion they were passed unanimously:

"Resolved, That it is the sense of the Association that the best use that can be made of the State Convicts is in the construction and maintenance of the public roads and that in allotting convicts to counties for this work those counties that do not have enough convicts to warrant a convict force of their own shall be allotted a sufficient number to make a workable convict force.

"Resolved, That any net income that is derived by the State prison from working the convicts on the State's farm shall be used for the benefit of the public highways.

"That we condemn the system of leasing convicts to corporations or using them to assist in the construction of any railway to the detriment of the public highways of the State which are for the common good of the people.

"It Is Further Resolved, That it is the sense of this

meeting that the State should appropriate from the State's treasury for the construction and maintenance of the public highways the sum of \$1,000,000 annually.

"Resolved, That we most heartily endorse Federal aid in public road construction and do hereby urge our Senators and members of Congress to give their earnest and serious consideration to any proposed legislation looking toward Federal aid to States in the construction and maintenance of the public highways.

"Whereas the location and construction of the proposed highways in the State tend to promote the proper location, construction and maintenance of Good Roads in the section through which they pass,

"Be It Resolved, That in order to keep alive and increase the interest in building of said highways that it is highly expedient that tours of inspection at such intervals as the promoters and friends of said highway think best be made, and

"To this end it is urged that as many of those interested in the construction of these highways join in these tours of inspection in order to show that they mean business.

"Resolved, That the Good Roads movement can be furthered in North Carolina by the organization of county roads associations and that we herewith urge every county in the State to organize such an association and become affiliated with the State Association and the American Association for Highway Improvement.

"Resolved, That we regret the failure of the General Assembly of 1911 to enact the legislation proposed, creating a State Highway Commission and providing adequate engineering assistance to the counties in the construction of their roads.

"Resolved, That we extend to the Hon. L. W. Page, Director of the U. S. Office of Public Roads, our sincere thanks for the assistance his department has rendered this State in its Good Roads Work.

"That the thanks of the Association be extended to the Press of the city and of the State of North Carolina for their great assistance in the Good Roads movement.

"That the Association extend its thanks to the Mayor of Winston-Salem for the use of the city; to the Board of Trade for courtesies extended, and to the citizens of Winston-Salem for their warm hospitality, in extending the use of their automobiles, and in numberless other ways."

Perhaps one of the most far-reaching steps taken by the Association was the favorable action upon a resolution presented to the Association by Secretary Kuykendall of the Winston-Salem Board of Trade, recommending that a State Board of Trade be established by the State Legislature. This resolution was referred to the Executive Committee, which will take proper steps in the matter. The resolution is as follows:

"Whereas, There are at present about seventy-five local industrial organizations in North Carolina, known as Boards of Trade and Chambers of Commerce, or similar organizations, which are recognized to be essential in the life and progress of a municipality, and

"Whereas, There is no state organization through which local organizations and communities can work unitedly in matters of importance to the industrial

progress of the State, and,

"Whereas, Most of the states now have such organizations,

"Therefore, Be It Resolved, That the North Carolina Good Roads Association, assembled at Winston-Salem, at its annual meeting, hereby endorses the establishment of a State Board of Trade, in order that the best interests of our state may be promoted and its development along industrial lines be placed on an equal footing with other states, which now maintain such organizations.

"Be It Further Resolved, That the next General Assembly be, and hereby are requested to consider the matter of establishing a State Board of Trade, and that the daily and weekly press are requested to publish these resolutions."

A resolution was introduced by Mr. J. A. Wellons of Smithfield, recommending a thorough inspection of the Central Highway from Raleigh to Beaufort Harbor. The inspection over this section of the highway will be made about the middle of October.

A motion was passed authorizing the president of the association to appoint a committee to confer with a committee from the organization of rural letter carriers relative to formulating plans for interesting the farmers in improvements of the routes over which the mail carriers must travel.

A rising vote of thanks was tendered to the retiring president, Mr. John L. Patterson, and Secretary Pratt for the excellent work done during the past year. Also resolutions of appreciation of the fine

work done by the trustees of the Central Highway were adopted. Especially did these resolutions recognize the valuable aid rendered by Mr. Wm. Dunn, of New Berne, who furnished his automobile and chauffeur for the trip across the State, and also the J. I. Case Threshing Machine Company, which furnished an automobile and a chauffeur free of charge for this tour.

The Membership Committee made suggestions for increasing the revenue of the State Associations. The Nominating Committee made its report, which was accepted and the following officers were elected for the next fiscal year: President, H. B. Varner; Vice-Presidents, (one from each congressional district), R. R. Cotton, Bruce; John L. Patterson, Roanoke Rapids; R. L. May, Trenton; M. C. Winston, Selma; P. H. Hanes, Winston-Salem; D. McEachern, Wilmington; Leonard Tufts, Pinehurst; P. B. Beard, Salisbury; F. M. Shannonhouse, Charlotte; E. C. Chambers, Asheville; secretary, Joseph Hyde Pratt, Chapel Hill; treasurer, Joseph G. Brown, Raleigh. Executive Committee: H. B. Varner, Lexington; Joseph Hyde Pratt, Chapel Hill; Joseph G. Brown, Raleigh; H. R. Starbuck, Winston-Salem; Frank H. Fleer, Thomasville; Wm. Dunn, New Berne; R. M. Phillips, Greensboro; Dr. C. P. Ambler, Asheville; Henry C. Dockery, Rockingham; P. D. Gold, Jr., Raleigh; Wade Harris, Charlotte; Jas. A. Wellons, Smithfield; W. C. Feimster, Newton; W. C. Hammer, Asheboro.

Co-Operative Road Building in Tennessee

By CHARLES C. GILBERT, Secretary of the Memphis-Bristol Highway Association

Having the privilege to speak at so representative a gathering as this, is, I assure you, no small honor, and, coming as I do from a sister state, from a city whose borders are almost as extensive as this great city in which we meet, I bring greetings to you and to assure you that the Old Volunteer state is forging to the front and will soon take her place high up in the galaxy of states with improved highways.

I have selected for my subject at this time "Co-operative Road Building." I shall speak on this subject because I am more familiar by reason of my connection and interest in the good roads movement in Tennessee. I am not a road builder in the sense that I can take a surveyor's instrument and locate the proper route, or that I can take the draftsman pen and reproduce grades and curves, or even with the pick and shovel build a scientific roadway, but, Mr. Chairman, if building roads on paper counts for anything, I feel that I should be retired on full pay.

The question of road building in Tennessee, like many of our other states, has been a perplexing one. Politicians have risen to fame and fortune on the golden promise of improved highway conditions, but the improvements never came and the entire state has been the sufferer. Leading out from our larger cities, magnificent roads have been built, but for the rural sections—just any kind of road would do. Farm values decreased. Thousands of acres of our land went to waste. Fences decayed. School terms shortened. The distances grew greater. But there was an awk-

ening. A few of us set in motion some plans to revive and quicken an interest in highway improvement in the entire state.

Our plan was to build roads on the co-operative idea, having noticed the good results accomplished in



MR. CHARLES C. GILBERT

other states along this line. We figured that if one man can do a certain amount of work in one day, one hundred men could do even more than one hundred

times as much in the same day, so we decided to ask the men of Tennessee to join in a co-operative movement to build a road from Memphis, Tenn., to Bristol, Tenn., a distance of 542 miles in two days, on the 14th, and 15th, of August.

We had read of the account of the greater accomplishments in Iowa, where a road 380 miles was built in one day. In Nebraska, where a road of twenty miles had been built in a day. In my own city, we had fresh in our minds the feat of building a beautiful church in a day. We went back still further and read of great military roads being hurriedly constructed. In our soliloquizing, we said that if the people elsewhere could do all this, then the people of the great sovereign state of Tennessee could do the same, and more too, so we organized the Memphis-to-Bristol Highway Association, electing Mr. George A. Gowan, a traveling salesman, as president of the organization.

Our first effort was to bring the people up to the point where they wanted better roads, to see that it was to their advantage to join heartily in a co-operative movement to build the highway from one end of the state to the other. After creating sentiment in favor of the project, we endeavored to tell them how it could be done. We used different illustrations and ideas. In one of the larger meetings we held, I told about the log-rollings my father used to have on his farm. How he would cut the trees and ask the neighbors to join in rolling the logs in great heaps. He could have labored until dooms-day in his own strength without results, but with the united help and co-operation of his friend and neighbors the new-ground would soon be cleared ready for the plowshare. While the men were thus engaged, the women would gather around the quilting table and use their needles in unison with their tongues. This was a concrete example of co-operation. They immediately entered enthusiastically into the movement, and within a short space of time we had organized forty-two counties, each affiliating with the state organization. The county organizations went to work, with a vim, to get men and boys to sign a blank to either work two or more days on this road, to give money or material, to furnish wagons and teams, to give right-of-ways through their farms, to give free access to gravel pits or to do something to help carry to a successful completion the greatest good roads project ever attempted.

At the present time we have the signatures of 32,864 men who will, in some way contribute to this cause. Over thirty-two thousand men, with more than six thousand teams, are saying to us—make your survey, locate your route, give us our orders and for two days, and as many more as necessary, we will build roads and history for Tennessee. More than one hundred and thirty thousand dollars have been subscribed by individuals, Commercial organizations, Drummer organizations, Automobile Clubs, and Highway associations to be used in the various counties along this proposed highway.

It was our purpose to have the road surveyed this month. We had asked the state of Tennessee to appropriate the sum of \$15,000 or as much as necessary, to make an official survey. The bills were introduced in the legislature, but on account of the attractiveness and allurements of this splendid city of yours, a majority of our law makers, journeyed here between the suns and thus, for the time being, gave the Memphis-to-Bristol Highway its first set-back. In working and talking for this highway, we are saying to the people, that it is not for us to say through which counties this road should go, you must decide this yourselves. You must

show the commission and the engineers what you propose to do in the way of road building, you must show how many miles of completed roads you have. How many bridges you have and will build. How many men and teams you can offer. How much money you can give towards the construction of the road. What your county courts are willing to appropriate for this highway. After you have done all this, then it will be decided which of the routes is the most practicable, the most feasible and which can be built within the shortest space of time.

Feeling that there is a possibility of our legislature not getting together with their petty political differences, we have decided to buy fifteen thousand buttons on which is printed, "I have given \$1.00 for the survey of the Memphis-to-Bristol Highway, have you?" We are going to show the people of Tennessee what we have accomplished thus far, and make to them one strong patriotic appeal for the cause of good roads. There are at least fifty thousand men who will become interested in our movement before August and we believe fifteen thousand of these will play a "button game" with us in order to have the survey completed next month. When this survey is completed, the first thing we propose to do is to erect a substantial mile post, on top of which we hope to have placed a government mail box in order to protect same. We will then have plans and specifications made for the improvement of the road, showing in detail, what will need to be done between certain mile posts. How many men and teams will be required and what kind and how much material will be necessary. A commissioner has already been selected for each mile. For several days in advance, yes, weeks, he will have his full instructions for his mile. A notice will be sent to the required number of men to report for "duty" at a certain point between the two mile posts and do a certain kind of work. There will be no confusion, no hesitation, for if a man is to haul material he will report with his team and know just what he must haul and where to haul it.

The first day will be spent in grading and building bridges and culverts and approaches, the second and as many succeeding days as is necessary, will be spent in metaling and rolling. It is not my purpose or intention to leave the impression that we propose to build a completed road in so short a space of time. We do not even hope for this, but we do expect to survey a route, dedicate, grade and in many places, metal it, and then as the time goes by the road will be finished. Many miles of this proposed highway is already built and will not have to be reckoned with at all during this campaign, but there are some sections where enough men and mules cannot be had to complete it during the designated time.

Our whole aim and desire in this matter was to first stimulate a healthy sentiment in favor of better roads in Tennessee, second to encourage the people to come together and build their own roads, and third, to have a continuous highway from one end of the state to the other. In all of these we have been successful. A great awakening has set in. County after county is issuing bonds for building public roads, bridges and for maintenance. Individuals who have never been classed as good roads advocates are giving liberally to this cause, and forty-five counties are vying with each other in a good natured rivalry to get this highway.

But that is not all, some counties must be left out when the official survey is made but they are not to be outdone and they propose to build roads through their section regardless of the highway, and in this way we will show to the world what can be accomplished

through a co-operative concerted action by the people of this state.

In planning our campaign we have not neglected to utilize every force. For instance, we are organizing associations among the ladies, the object of which is to get them to furnish dinners on these two road working days for the men, and can you imagine a greater sight than to see a picnic five hundred and forty two miles long, where at least fifty thousand men, with as many women are congregated to eat, drink and be merry over the launching of the greatest good roads era Tennessee ever saw. But the plans must not stop there, neither can we permit the men to stop, and we are calling upon the boys of tender age to 'carry water' to those who toil. It is to be a co-operative movement and every one must find a place for service.

It is remarkable what a widespread interest has been created in this work. Men of every station in life are talking about the highway, not only talking, but propose to actually work on the road those days. Several men have agreed to pay for the services of one hundred men for the two days. The railroads will co-operate by furnishing free transportation to places where the largest number of men are needed. Automobile clubs over the state are already planning to take workmen, in large numbers, from the cities to nearby counties and bring them home. Liverymen all over the state are offering their teams for the two days.

In our work thus far every agency has contributed so liberally towards the success of the project that it is difficult to say where we have derived the most help, yet without the assistance rendered us by the press of the state our work would have come to naught. We now have 92 papers in the state backing us in this work, giving their pages freely each week in telling the people of Tennessee what is being done. Not only are they printing what we send them, but they are writing editorials in favor of the movement. We will succeed because the best people of the state and the newspapers are back of us. We are also free from polities. No matter what party a man belongs to just so he is for good roads, we are for him. We have started out to make it a movement of the people for the people, and the only place we can't fill is for a man who sits in the shade and says the thing can't be done.

And now, Mr. Chairman, in conclusion, let me say that when a call 'to duty' is sounded in Tennessee the people respond. In the early sixties when the war clouds were brewing, and war was declared between the states, a call went out to Tennesseans to shoulder arms and fight for their native Southland. Thousands upon thousands responded to this call and with sword, and musket they performed a duty, as they saw it, to their home and state. The terrible conflict was over, leaving death and destruction in its wake, but ere long prosperity began to show signs of a resurrection morn. Cities grew to great magnitude, manufacturing plants were established, the hum of a thousand spindles was heard and the south came into its own. Gentlemen, today we are sounding the bugle call in Tennessee for the descendants of both those who wore the gray and who wore the blue, to shoulder, not weapons of warfare, but of service and to march in one solid phalanx

to the side of the Memphis-to-Bristol Highway, and there, with pick and shovel build roads and history for the entire state of Tennessee.

W. S. FALLIS, WILSON, N. C.

Civil and Highway Engineer

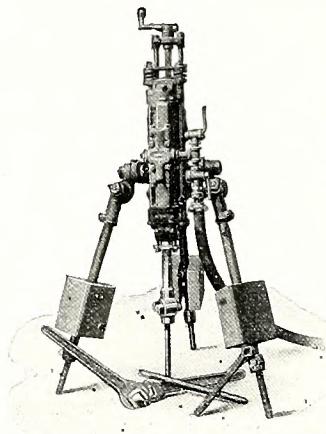
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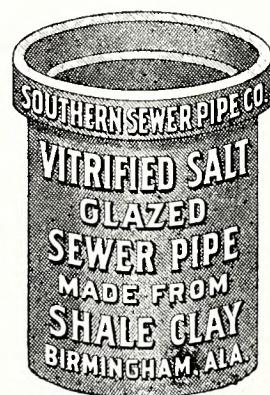
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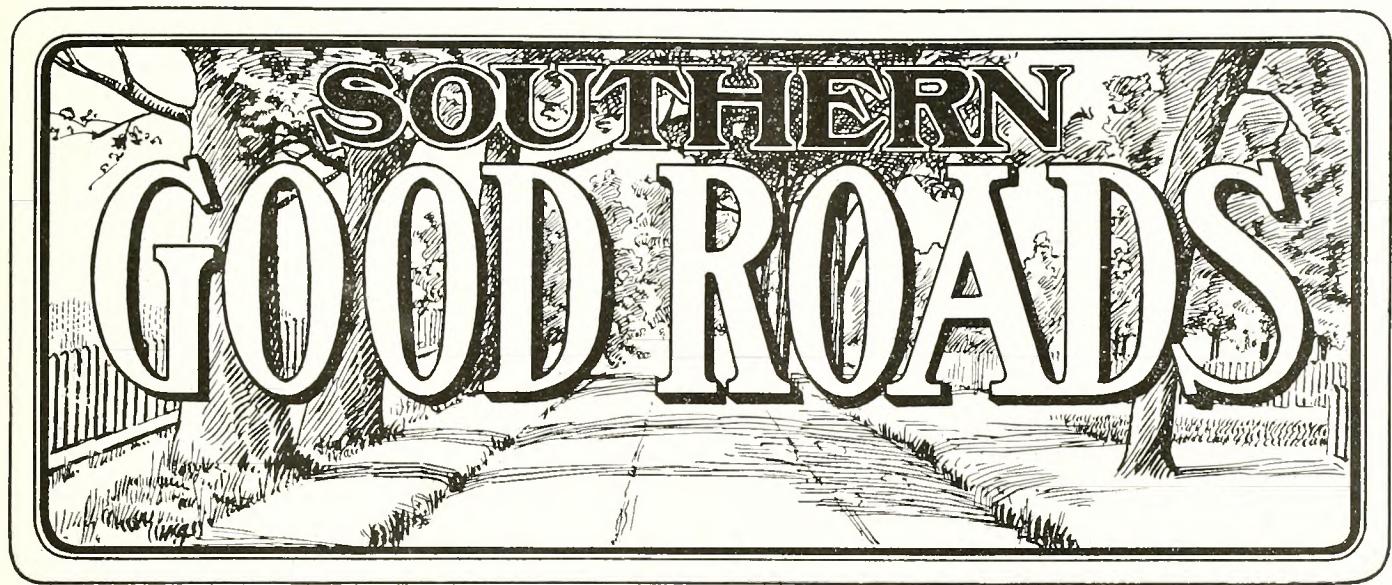


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Methods of Financing Good Roads

By MR. P. D. GOLD, JR.

The question "Resolved that good roads are profitable" has ceased to be a subject of debate. No theory of Pinchot or Roosevelt for conservation of energy so well conserves as that of the construction of good highways. The nature of the construction and the best road to build is an engineering problem; but, whether constructed of macadam, sand-clay, or other material, the main question, after all, is the necessary funds. The financial end is an important feature, for without the means, the end cannot be obtained. If it is possible to pay cash it is always preferable, but this seldom can be done; therefore, extensive highway construction must be brought about by obtaining money on time, or by the issuing of bonds, as in this way alone can future beneficiaries assist in paying the cost. The civic unit borrowing these funds should be either the township or the county, and of these two the county is preferable.

From the standpoint of the borrower, the paramount question is to obtain the greatest amount of money at the smallest cost, and from the standpoint of the lender, who is the bond buyer, the question is to, first, obtain the best security for his money, and second, a reasonable rate of interest thereon. As the value of the security decreases, the rate increases. The United States Government, by attaching the circulation privilege, can borrow money at 2 per cent, without this, at 3 per cent; the state can float its bonds at 4 per cent, as they are non-taxable; while the county usually pays 5 per cent on its bonds, as they are not free from taxation; and most individuals pay 6 per cent and upward, according to their standing in the community.

If the county can borrow money at the same rate as the state, saving the difference of 1 per cent per year, this difference would, within a definite period entirely pay the principal. In other words, in forty-one years, the difference in interest between a 5 per cent and a 4 per cent bond, if invested and compounded semi-annually at 5 per cent, would mature the bonds

at the end of forty-one years; but a county cannot float its bonds at 4 per cent, or even 4½ per cent., 5 per cent. being the usual rate, and some have to pay even more than this. Furthermore, experience has proven that very few counties will properly care for and reinvest a sinking fund in order to mature its bonds. It is usually the case that the money set aside for a sinking fund is used for other purposes, and at the maturity of the bonds, it is necessary to refund. Therefore, if some plan can be devised whereby the county can receive the advantage of the 4 per cent ratio, and have the difference of 1 per cent properly cared for each year, it would seem worthy of investigation.

The object of this paper is to set forth as fully as space will allow the details of a method of financing along this line, calling attention to the advantages, while carefully considering and endeavoring to locate and discuss all possible objections. The method suggested is as follows:

The county that cannot obtain a rate of interest lower than 5 per cent, and has need of the proper means of handling a sinking fund, is to vote for an issue of bonds not exceeding a certain percentage of the taxable value of the property of the county. This bond should be an agreement to pay to the state treasurer a fixed sum semi-annually, which should be 5 per cent. of the amount of the obligation, such payments to continue for forty-one years, and to be collected and accounted for like other state taxes. This bond is to be submitted to the Attorney General, so that both form and legality of the vote can be approved by him. The bond being deposited with the State Treasurer, he would issue in lieu therefor an equal amount of state bonds bearing 4 per cent interest, to be sold at not less than par, the sum thus received to be turned over to the county for the purpose of road building. This fund, of course, should be expended under the supervision of the state engineer and the county authorities and used only for permanent road construction. Any amount of bonds could be thus issued up to some fixed

amount which would not make the annual bonded indebtedness of the state for a term of years too heavy. Any county desiring this accommodation and properly conforming to these rules could apply, and the amount of bonds issued in any six months should be distributed pro rata in proportion to the amount necessary for them to spend during the first six months. Whether each six months the amount of bonds issued would be fifty thousand, one hundred thousand, or half million,



MR. P. D. GOLD, JR., of Raleigh, N. C.
Member of Executive Committee, North Carolina Good Roads Association

the results would be the same under this plan.

For the sake of argument, we will presume that the amount of the bond issue allowed by the state would be one hundred thousand dollars. The state treasurer, therefore, upon the counties depositing \$100,000 5 per cent bonds with him, would issue an equal amount of 4 per cent bonds. At the end of six months, he would issue the same amount of state bonds, less the amount of surplus received being the difference between the 4 per cent rate paid on the state bonds and the 5 per cent received on the county bonds. Every six months, in the same way, the state treasurer will continue to issue the amount of bonds equal to the amount deposited with him by the counties, less the amount of surplus fund in his hands. Both the county and state bonds would run forty-one years. At the end of the

first six months the amount of bonds issued by the state treasurer would be \$99,500, which, together with the surplus fund of \$500, would equal the \$100,000 of county bonds deposited. The surplus fund thus obtained is the difference between $2\frac{1}{2}$ per cent paid by the county, and the 2 per cent semi-annual interest paid on the state bonds. At the end of the first year, the amount to be issued by the state treasurer would be \$98,990, which, together with the surplus fund of \$1010 would equal \$100,000; and each six months thereafter this method would be continued. At the end of the tenth year, provided the counties used \$100,000 each six months, the state would have a surplus, or difference in interest, of \$12,148.80, and be entitled to issue bonds amounting to \$87,851.20. Of course the state would not issue the odd dollars and cents, but would issue its bonds in even hundred dollars, adding sufficient to make \$100 when the amount was over \$50, and subtracting when under \$50. In one year there might be an excess, but this would be offset in succeeding years by the decrease, and they would ultimately balance. Each succeeding six months the amount of state bonds issued would decrease, and the amount of surplus would increase until, at the beginning of the last semi-annual period or the middle of the forty-first year, the amount of surplus, or difference in interest, would be \$99,324.63, the bonds issued only \$675.37. At the end of the forty-first year, six months prior to the maturing period of the first state bonds issued, the surplus fund would be \$101,811.13, more than sufficient to meet the requirements of the county desiring the \$100,000.

On the date of the first maturing period, the state would have in its treasury \$8,200,000 5 per cent county bonds, and have outstanding its own 4 per cent bonds amounting to \$5,200,000. It would have expended on the roads of the commonwealth the sum of \$8,200,000 and the increase in the taxable value occasioned by this expenditure during forty years can be at once appreciated. The forty-second year would commence the maturing period, and every six months thereafter \$100,000 of the county bonds would mature and be returned for cancellation. The state's income for the first six months would be $2\frac{1}{2}$ per cent on \$8,200,000 5 per cent bonds, which would equal \$205,000, \$100,000 of which would be used in retiring the first maturing state bonds, paying interest on the remainder, leaving \$1,811.13 excess, and in the same manner every six months the sum received for interest from the remaining maturing county bonds in the treasury would be sufficient to mature the state bonds issued forty-one years before and maturing that year, paying the interest on those still outstanding, and leave an excess of \$1,811.13 each year.

While it would be eighty two years from the beginning of the first bond issue before the last bond matured, it would be only forty one years from the time that particular county first issued its bonds, because the bond maturing the eighty-second year would be the one issued the forty-first year.

The figures have been prepared for each successive year, showing each item of bonds issued, interest received, interest paid, and surplus after the first forty-one years, and after that time the income, bonds retired and excess. They have been calculated, checked and re-checked by Mr. W. S. Wilson, of the Department of Secretary of state, and are vouched for by him as being absolutely correct. I have only taken the figures at stated intervals to show an outline of the method.

It is impossible for the county to default in interest, because the state had the privilege of collecting just

the same as taxes. If at any time no county should desire further bonds, or if for any reason the state should be unable to float its bonds at par, the general plan saving of \$1,000. In other words, it would cost the county 6 per cent a year to mature its bonds, and this would not be affected in the least, so long as the surplus fund was re-invested at 5 per cent. and compounded semi-annually. The plan, therefore, could not be affected in this way.

To prove the fact that this money can be re-invested at 5 per cent. the state board of education has handled the school building fund in this manner several years and has always had demands for investments at this rate of interest.

If a greater amount than \$100,000 semi-annually is desired, these figures would only be multiplied by the figures desired, or if less than \$100,000, divided in the proper proportion.

The advantages of this method are:

First: That it saves to the individual county the amount of money which it would set aside each year as a sinking fund; i. e., the county issuing \$100,000 of bonds at 5 per cent, would have to pay \$5,000 each year for forty years, or \$200,000, and at the end of that time would still owe the principal. In order to lay aside a sinking fund to retire these bonds, it would take 1 per cent. or a total of \$6,000 for forty-one years, which would equal \$246,000. Under the plan above laid out \$205,000 would be all the county would pay, or a calculation is on the basis that the county would have the most perfect system of caring for its sinking fund. This has seldom proved to be the case.

If bonds which are yearly being refunded were paid, it would be better for both the borrower and the lender. The reason they are not paid is because the sinking fund is not properly cared for. The state could easily, and at small cost, handle this highway bond fund, and, if the same care is taken as is observed by life insurance companies in calculating the reserve for

maturing of endowments, the plan would become very simple.

Second: Another advantage is the saving to the county by part of the interest maturing the principal.

I am aware of the fact that there would be criticisms against this plan, but it would seem that if a son desired to borrow money for purposes not only legitimate, but laudable, with his collateral in hand and was able to borrow at 5 per cent., but with the endorsement of his father, would be enabled to borrow at 4 per cent., saving 1 per cent which would enable him to pay his indebtedness in a certain period should not the parent, as a good business man, use his own credit for his son's benefit? The comparison is respectfully submitted as entirely proper, only that in the case of the state it receives a large benefit by the increased taxable value of the property. As to the question between father and son, I would readily answer that it is right, provided the parent's credit is not injured by using it for his son's benefit, and that it does not hinder him from meeting his necessary obligations. There is no question as to the collateral which the state holds. There is no question as to the saving to the county. Would the issuing of these bonds affect the credit of the state? The reply to this would be that it would not affect the state's credit any more than the issuing of any other bonds. In fact it would have the tendency to add to the credit of the state, rather than injure it for the reason that there would be a certainty of redemption. Furthermore, there is a guaranteed means of paying both interest as well as principal. By the enactment of a strict law requiring that the surplus fund should at all times be re-invested in county bonds or returned to the counties under this method, and that the interest on the county bonds should only be used for this purpose and for redemption of state bonds, the certainty of their redemption and the payment of the interest would make this class of road bonds more desirable than other state bonds. It would be possible



Poorly Drained Road Near Allendale, South Carolina

to set forth in the state bond the fact that it carried the additional security, and this would tend towards a better price being realized on this bond than other bonds and in that way improve the salability of whatever other of the state's securities it was desired to float.

If there is any criticism of this plan, it is certainly not against the principle, but against the issuing of any bonds on the part of the state, and, if such a principle is improper, then it would naturally follow that a county's credit would be injured by the issuing of bonds, and this would prevent all bond issues for road construction, which even the worst enemies of good roads would not contend. So, if it is proper for a county to issue bonds for good roads, where is the impropriety in allowing the state to assist it by its endorsement?

The objection might be raised that the outstanding bonded indebtedness would run too large. However, an examination to this effect will show that by issuing \$100,000 every six months, or \$200,000 per year for forty years, there is only a bonded indebtedness outstanding of a little over \$5,200,000 while \$8,200,000 has been expended for the improvement of the county roads, materially increasing the taxable value of the property therein. If the amount of bonds issued annually under this plan was \$400,000, the total bonded indebtedness at the end of forty one years (which is the period of the largest bonded indebtedness) would be only \$10,400,000, while \$14,400,000 has been expended in the construction of good roads. While this may seem a large amount of money, if we consider the increased taxable value of property during the past forty years, with the increased facilities afforded by road building, and what the increased taxable value

would be in the next forty years, we can readily see the increase in tax values would gradually offset the expenditure of the counties on account of these bonds.

It, therefore, would seem that the state and county could both afford it, as the state is guaranteed its income to pay the indebtedness, and the county is benefitted because this plan enables it to get its money at a reasonable rate of interest with which it could mature its bond interest without the payment of the principal.

The objection may be raised that this system is a form of paternalism; that the state is fathering the county, and endorsing it to enable the securing of funds. Probably these critics have forgotten the history of the construction of railroads. The state gladly exchanged its bonds for the bonds of railroads which were often owned by private corporations, without even providing the means of redemption. Some of the most valuable property owned by the state of North Carolina to-day is the stock of the North Carolina railroad, which was obtained in this way. If it is proper to assist a private corporation by exchanging bonds for preferred stock or bonds, then it is certainly legitimate for the state to assist its counties in building highways for the public good.

A further criticism may be advanced that at some future time the counties may be able to secure money at a cheaper rate than 5 per cent. This is answered upon the grounds that all bonds are purchased upon the basis of the present bond market and the present rate of interest, and a man who will not borrow money to-day at 6 per cent to carry on legitimate business because he thinks he may be able to get it for 5 per cent next year will likely die of old age before he accomplishes results. But, provided the county should



Macadam Road Near Greenville, S. C. Foreground Granite Macadam. Background Granite Macadam With a Tar Binding

later be able to obtain cheaper money, it has already obtained the advantage of the improved roads, which will give it an advantage over those counties which have retarded their progress by waiting to get money at a lower rate. However, if the rate should be lowered, it would in no way affect the plan, because those counties which had already gone into it would continue to make payments and mature their bonds.

One of the arguments suggested against this system is the fact that only a few counties would be helped by this act; that the annual bond issue of \$200,000, or even \$400,000, would be such a small amount, that only a few counties would derive benefit therefrom. In reply to this it is to be remembered that during the year 1910, in the state of North Carolina, the entire bond issue for road building aggregated about \$360,000. It is well known that in road construction the entire amount voted is not used at once, but over a period of years; therefore, only about one-fourth would be used in any one year, which, in the year above referred to, would only have amounted to \$90,000. Calculating that the amount voted that year was less than the average, then for the state to furnish \$400,000 it would take probably a million dollars bond vote from the separate counties. If this would not be sufficient to meet all demands, the amount could be divided pro rata among those counties which had met the requirements, and the further needs of the counties could be secured through some other arrangement.

I have consulted some of the best engineers and financiers in the state regarding this system, and have found all of the engineers consulted enthusiastic on the subject. Among the financiers I have found some who have approached it cautiously, their conservatism being based on their objection to the state issuing large amounts of bonds; but, when they looked carefully into the method, they were forced to confess its features are attractive.

A bill providing for the issuance of bonds under this method was introduced in the last legislature of North Carolina, was endorsed by the State Highway Association, was opposed by a special joint committee on roads and highways of both houses, was reported favorably by the full committee on Highways and Turnpikes, was approved by the committee on Appropriations in the Senate, approved by the House Finance Committee, passed third reading in the house by a vote of 87 to 13, and was only prevented from becoming a law by three majority against it in the senate. This would seem to be sufficient evidence that there is great

merit in the proposition, and that it is one which will be of great benefit to the state not only for the present but future generations.

It will be a matter of interest, along this line, to know that on May 18, 1911, there was a bill introduced in congress by Mr. Hobson of Alabama, providing for an appropriation for the improvement of the roads on the different rural delivery routes, provided the state or county would furnish half of the amount.

These rural free delivery routes are usually the main thoroughfares of the country districts. Whether this bill becomes a law or not, it shows a tendency of the public mind toward the partnership plan between county, state, and national government for internal improvement.

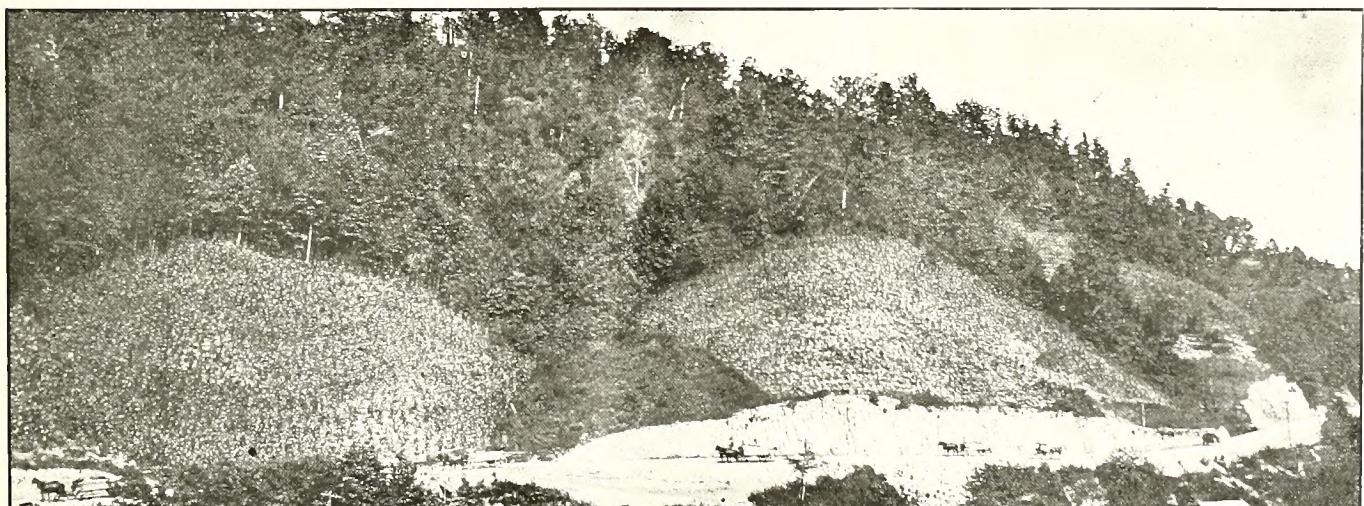
Swanson Good Roads Bill.

Commenting on the Swanson bill in congress to appropriate \$20,000,000 a year for five years to aid in road improvement in the states, the Washington Star says:

An annual expenditure of \$20,000,000 for five years by the United States would give the country a foundation of a system of good roads. The states have failed to do this work. Some cannot afford to undertake it, and others have utterly neglected the duty which government owes to the people. The United States can best afford to start the movement, and by contributing \$100,000,000 to the cause of cheap local transportation stimulate the states to a keener appreciation of not only the value of roads to the people individually, but their benefit to the commonwealth as a whole. The state which is provided with a series of well built, carefully located highways will soon outstrip in prosperity and intelligence another that permits its inhabitants to continue to founder in the mud.

Southern Appalachian Good Roads Association

The Executive Committee of the Southern Appalachian Good Roads Association have decided to hold the annual convention at Roanoke, Virginia, September 27 and 28. A splendid program will be arranged and the Committee expects to make this the best convention that the Association has ever held. At the present time membership in the Association covers the states of Virginia, North Carolina, South Carolina, Georgia, Tennessee, and Kentucky. It is hoped that by holding the meeting in Virginia that West Virginia will join the Association. All interested in good roads are invited to attend the sessions of the convention.



Southside Warrior Mountain on Lenoir-Blowing Rock Turnpike, in Western North Carolina

Economic Problems in Road Building

By HON. JOHN H. SMALL, Representative in Congress From the First Congressional District of North Carolina

Prefacing my paper, it is proper to say that I shall make no effort to indulge in "high flown" language and even if I could do so, it would perhaps be unwise, in the discussion of so practical a problem as that of securing good roads. Sometimes, in the flood of words, ideas are either discolored, or lost in the maelstrom. Perhaps I may have the satisfaction of bringing to the readers of Southern Good Roads one or more thoughts which may be helpful in the wise solution of this great economic problem. It is a very practical subject in all its phases, and is interwoven with the economic and industrial progress of our state.

This subject of public roads is closely interwoven in-



HON. JOHN H. SMALL

to the warp and woof of our economic life. As North Carolina is yet, in a large degree, an agricultural state, I may illustrate best this proposition by showing the important relation which improved public roads bear to agriculture. It is estimated that the cost of hauling products over the average country roads is 25c. per ton per mile. Upon a first consideration, this may not appear to be an excessive cost for transportation, and yet when you consider that the average cost of movement over the railroads of the country is only about 7 mills per ton per mile, you can see that it costs about thirty-five times as much to haul products over the average country roads as it does upon an average to haul them over the railroads. We have in the past,

and still are, exercising ourselves to obtain better freight rates, and to eliminate all discrimination as between individuals and sections, and the wisdom of this agitation cannot be doubted; yet we only pay, upon an average, one-thirtieth upon our railroads as compared with the amount we pay for transportation upon the average highways. It is estimated by one authority that the average haul upon our roads is twelve miles, and that the average load is two thousand pounds, and as stated, the average cost is 25c. per ton per mile. According to the report of the Interstate Commerce Commission in 1906, the railroads handled 820,164,000 tons of freight, and of this aggregate, that 32 per cent. consisted of agricultural and forest products, amounting to about 265,000,000 tons. Of this latter quantity, it was estimated that about 80 per cent. or 200,000,000 tons, was hauled on the country roads, which, with an average haul of nine miles, and at an average cost of 35c. per ton per mile, would make the enormous sum of \$432,000,000 per annum. The cost of hauling over the improved roads of Germany, France, and England is estimated at 10c. per ton per mile. The cost of hauling over the dirt roads of the south, containing mud and ruts, is 39c.; over wet, sandy roads 32c. and over dry sandy roads, 64c. If you assume that the average cost of hauling over the average country road is 23c. per ton per mile, and that by improving the road we could reduce this cost by one-half, or 11½c. per ton per mile, it would mean an annual saving of \$250,000,000. The weakest link determines the strength of the chain; the minimum depth of a stream determines the draft of vessels it can accommodate, and the worst portion of a highway, and the most difficult grade determines the load which can be carried as between any two given points.

Here is another illustration of the waste from bad highways. It is estimated that the average cost of hauling corn in the United States, is 7c. per hundred pounds. In North Carolina it has been estimated at 12c. In eleven southern states it was estimated at 15c. per hundred pounds, which is double the average in the United States. If you estimate that one-fifth of our corn crop is hauled over the country roads, there could be saved annually by improved roads \$7,200,000. As to our cotton crops, which are more largely hauled over the roads, first to the gin, then from the gin back to the farm, and finally to the market, it is estimated that we could save annually \$4,800,000 on the cotton, and \$6,000,000 on the cotton seed.

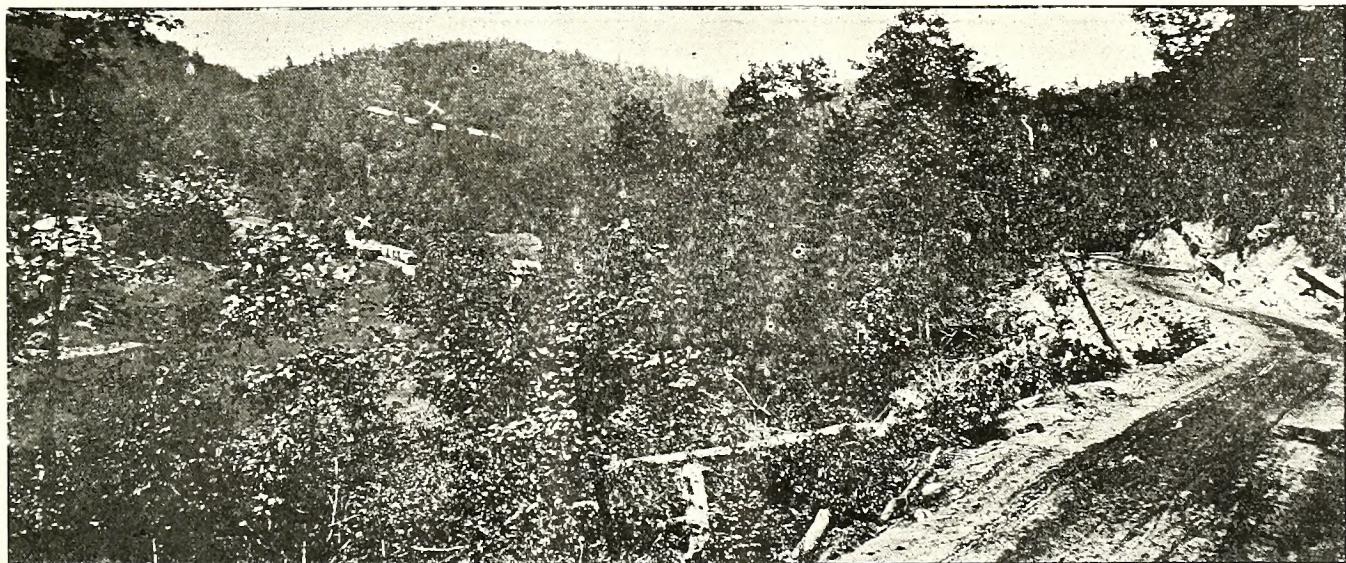
In my first consideration of this problem of improving our roads, two difficulties presented themselves to my mind. One was the great mileage of roads, and the other was in the process of selecting those first to be improved. The total mileage and the cost was so great, and the difficulty in selection so embarrassing that it seemed impossible to avoid friction and local dissensions. This difficulty is greatly minimized by the consideration of some propositions fairly well established. It is estimated that 90 per cent of the traffic upon our roads is carried upon 20 per cent of the mileage, and therefore that when 20 per cent of the mileage was improved, that 90 per cent of the products to be handled would be provided for, thus leaving only 10 per cent of the traffic to be provided for by the remaining 80 per cent of the mileage of the public roads. At the present time, it is estimated that in the south about 6 per cent. or 42,281 miles of its roads, have been im-

proved. This leaves 14 per cent. of this 20 per cent. of mileage unimproved, or about 94,756 miles. To improve this remaining mileage in order to make up the 20 per cent. at an estimated cost of \$2,000 per mile, it would cost in the aggregate \$189,512,000. If we apply the amount which we would save upon 90 per cent. of the traffic traveling over 20 per cent. of the roads, there would certainly be a saving of ten to eleven million dollars, which would more than pay the annual interest upon the total cost of improving the remaining 80 per cent. of the public roads in the south. The principal of this great sum could be paid alone from the increase in land values. In the southern states, there are 362,027,852 acres of farm lands. There are innumerable instances where lands have increased in value from the construction of good roads, from five to twenty-five dollars and more per acre. If we estimate the average increased value of our farm lands by reason of improved roads, at \$5 per acre, then there would be a gain in farm values alone in the south of \$181,000,000. This would nearly pay the expenditure.

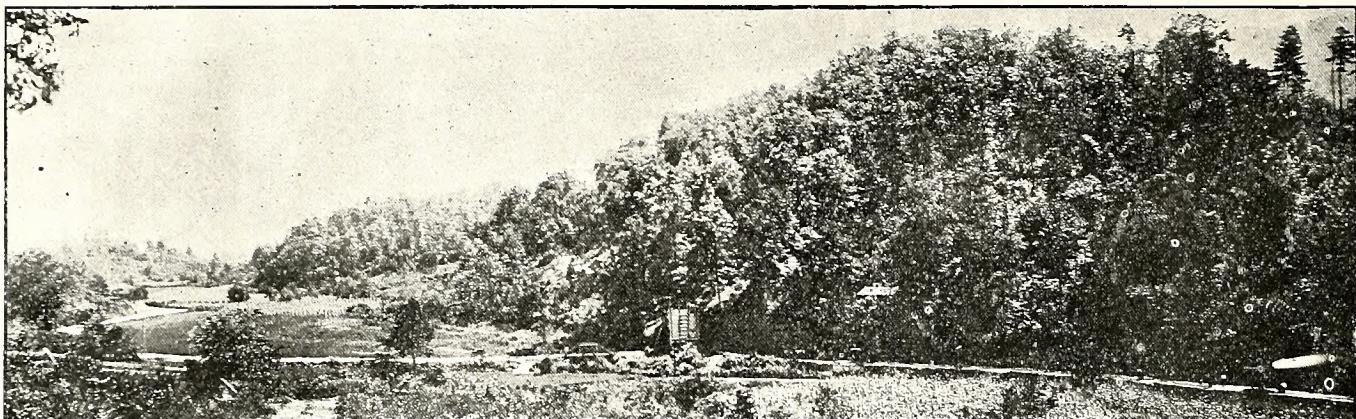
It must be apparent to everyone that every dollar expended in improved roads is an investment upon which a handsome dividend will accrue to the community and the county. Another advantage of improved roads lies in the introduction of improved methods of treating the soil and in crop production. The most profitable crops per acre are those produced by intensified farming. Their value, however, consists in getting them to market quickly and cheaply, and unless these conditions are met, there is no encouragement to the land-owner to engage in intensified farming. The cost to the farmer is estimated by the cost of raising the crop, plus the transportation to market, and the difference between this and the selling price constitutes the profit. The farmer cannot always control the selling price of his produce, but within reasonable limitations, he can control the cost of production and the cost of transportation over the public roads. Regarding the cost of production, this may be accomplished by the application of those agricultural methods which have been approved. The State Department, and the United States Department of Agriculture are engaged in the work of educating the adult farmer, and in bringing to him information of the results of these better methods. Their application means a greater yield per acre, at a decreased unit of cost, and this progression widens the margin between the cost of production

and the selling price. The apathy and indifference of our people to the great economic loss arising from bad roads is difficult to understand. I presume there has never been a time when our people have not appreciated the necessity of better roads, and deplored the existence of bad roads. The difficulty has been in the indisposition to take concerted action to improve them. The mere recognition of the bad condition does not mend it. We must appreciate the inconvenience and losses which arise from such bad conditions, and the profit which would accrue from repairing the same. We must also have an intelligent comprehension of the methods by which the better conditions can be obtained, and the cost of the same. Point out to me a community where a reasonable proportion of the citizens have intelligently studied this road question, the wastefulness of the one, and the profit of the other, who have studied the basic factors which enter into the construction and the maintenance of good roads, and the cost of the same, and who are willing to co-operate with their neighbors, for improved conditions, and I will show you a community which is actively engaged in the work of road building. A community, like an individual, may get in a rut and apparently have no disposition to move out. There are persons who day after day complain of their condition in life, lament most bitterly their misfortune, who never make the slightest intelligent effort to improve their condition.

A man who has become accustomed to the conveniences and improvements which make for his well being, will not thereafter be content to live without them. The man who has lived in the town possessing good streets, a system of drainage and sewerage, a healthful and abundant supply of water, and well lighted, cannot be induced to move to another town lacking in these facilities, and likewise a farmer who has lived in a rural community possessing good roads, telephone facilities, good public schools and intelligent neighbors, cannot be induced to move to another rural community which does not enjoy these advantages. The soil may be ever so fertile, and the climate ever so salubrious, but you cannot induce him to settle in a community which has not been touched by the wand of progress. If you will take the census of 1910, as I did, and look at the counties in North Carolina which have had the largest increase in population during the last decade, you will find that they have been engaged in road building, and in the maintenance of good public schools, ru-



Climbing the Blue Ridge in Western North Carolina on the Lenoir and Blowing Rock Turnpike



Between Lenoir and Patterson, North Carolina, on the Lenoir and Blowing Rock Turnpike

ral delivery, and telephones. I met a farmer recently in the City of Washington who was returning from a county in the state of Virginia which he had visited with a view to settling, and I asked his impression. He praised the climate, the soil, and liked the people, but stated that in his county in Iowa, they had built fine roads, and that it would require very strong attractions to induce him to move to a county with bad roads, and with no disposition on the part of the people to improve them.

By the way, this suggests the subject of immigration. I am aware that there are some of our people who term every non-resident of the state a foreigner, and who evince an indifference to new settlers. They say, "Reserve North Carolina for North Carolinians, and our lands for ourselves and our children." In my younger days I may have shared to some extent in these proscriptive ideas, but observation and study have changed my viewpoint. I have reached the conclusion that one of the necessities for future growth lies in attracting settlers to our state, who shall make their homes among us. If they are intelligent and patriotic, and willing to work, I do not care where they come from. We need more industrial workers in this state. To obtain them, we must treat them just as we would like to be treated if we moved among strangers, we must not only extend the glad hand, but we must give them a square deal.

Good roads are inseparably connected with good public schools, and for that matter, with the maintenance of strong churches. I heard a gentleman from Chatham speak of the difficulty of selecting school districts in his county, owing to the bad roads. It is a fact that the movement on the part of our State Board of Education to consolidate rural schools, and make for better school buildings, better teachers, and longer terms, has met its most effective obstacle in bad country roads. We shall not reach our ideals in public education until these school houses, of which we are building one each day, can be reached by good, dry roads.

I sometimes think that we who live in the town are not sufficiently mindful of those who live on the farm. Just a few years ago, when some evil minded men attempted to create friction and enmity between the town and the country, many of us regarded it as most deplorable; surely it was, and yet we may as well be honest with ourselves, and admit there was some foundation for it. 80 per cent. of our population are dependent upon the soil for their livelihood, and there is scarcely an urban community in the state which is not dependent, in more or less degree, for their prosperity, upon the success of the farm in the tributary section. The urban and the rural communities are interdepend-

ent, and there should not only exist between them a mutual bond of sympathy, but a disposition in all practical ways, to help in upbuilding the other. In attending some of the farmers' institutes in this state in recent years, I have been surprised to note not only the absence but the absolute indifference of the towns-people to these meetings. There were no conveniences provided, and not the slightest indication of intelligent interest, and yet every merchant would welcome each of these farmers into his store, and understand that his own prosperity depended upon the prosperity of the farmer. May we strive toward that era when the town people and the countryman shall possess a homogeneous spirit, each working for the betterment of the other, when each shall work only for the truth about the other, and each shall realize that his own interests are one and inseparable. During all time the farm has been the nursery from which has come the new, the strong, and the virile men and women, who have filled the gaps in the cities, and kept going the industry and commerce of the urban life. If the nursery is not maintained, the whole body politic will languish. The bottom factor in the healthy growth and maintenance of rural life is the improved country road.

We have of late been doing things in North Carolina. We have progressed. Manufacturing, principally in textile lines, has shown a most gratifying growth. Farm methods have been improved, yet we must remember that transportation is the very lifeblood of commerce, and that greater production requires enlarged avenues of transportation, and unless we improve the public road, the most important instrumentality of transportation, that our progress will reach its limitation.

There have been some difficulties in the past in this matter of road building. First there has been extreme localization. Efforts have been too largely confined to the rural district and the township. I now believe with Dr. Pratt, that the county should be the unit of organization, and that in some cases even this area might profitably be enlarged. Again, we have not appreciated the importance of supervision. We have entertained the pleasant delusion that anybody could edit a newspaper, conduct a hotel, operate a farm, or plan and build a public road. The error has been apparent in the bad results obtained in each. We are gradually learning that public road improvement requires skill in the planning and in the execution. Only a road engineer of approved skill and experience should be permitted to lay out a public road and make plans for its construction and improvement, and no road should be built except under his supervision. The county of Forsyth affords a conspicuous example of a community which has learned this lesson. It is among the first to secure the

exclusive services of a trained road engineer, and I congratulate the people of Forsyth upon their good fortune in obtaining the services of that skilled engineer, and loyal citizen, Mr. W. L. Spoon.

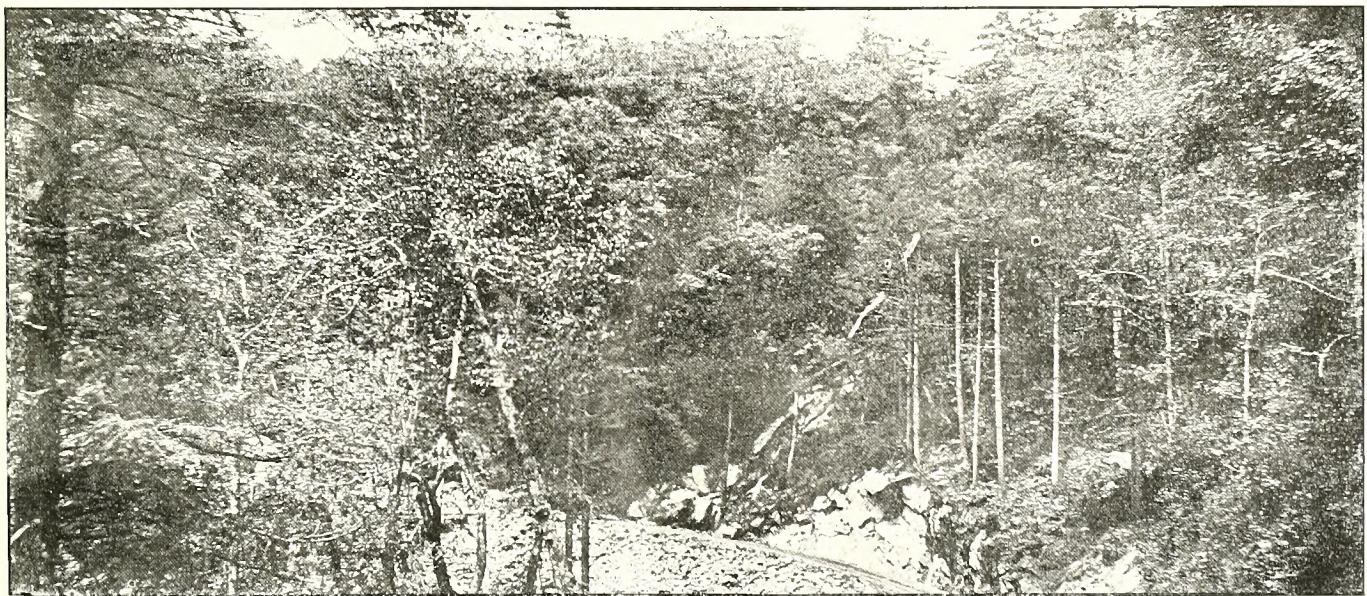
Another difficulty has existed in our method of furnishing the labor. Statute labor or the plan of paying the road tax in labor has never yet resulted in a good road and never will. The building of roads is a public function, and should be secured in the same manner as other public benefits. The revenue should be secured by the levying of taxes, by which every citizen will contribute, in accordance with his means. It constitutes one of the public burdens which must be assumed by every citizen. There has been a time when it was regarded as extremely impolitic for a man in public office to advocate road taxes, and yet I believe it is the duty of every man who discusses public questions to tell the truth as he sees it. The people are not as gullible or as foolish as some public men profess to believe. No man in public life can hope for universal approval of all his public acts, but he can maintain his own self-respect and integrity of purpose. So far as I am concerned, I would rather have the confidence of the people, even though they thought I was wrong upon a public question, than to have temporary applause when I knew I was wrong.

One other difficulty with our road problem lies in failing to maintain them after we build them. Many of us in the east have come to regard Mecklenburg as the banner county for good roads, but it appears that her people built good roads, and expected them to take care of themselves. Good roads, like all other human institutions, do not "stay put;" nothing is permanent. Disintegration is the law of nature, and the price of permanent highways is eternal vigilance.

At good roads meetings held recently many of the speakers have referred to "politics" as one of the obstacles in the movement for better roads. Why should this be true? Neither the term nor the man who is active in politics should suffer under this opprobrium. The ideal of every political party should be one of sympathy and co-operation with every movement which makes for the material betterment or the moral force of the people. Such an ideal is absolutely consistent with the militant democracy of a people. (I am not using this term alone in its party sense,) but there are such conspicuous delinquencies at times which seem

to furnish a basis for this criticism. For instance, as a part of this movement for better roads, every intelligent man knows we need a State Highway Commission, in order to afford intelligent assistance to and co-operation with the counties in the building of roads. The last legislature was asked to pass a law creating a highway commission, and to make an adequate appropriation for its maintenance, and yet that body turned a deaf ear to this demand upon the part of the people. I have a great deal of respect and sympathy with the charity of Dr. Pratt, in the excuses which he made for this omission of duty to the North Carolina Good Roads Association in June, but they do not excuse. The excuses which were made by the gentleman from Johnson county at this same meeting for the omission in failing to pass an act authorizing the people of that county to vote upon a bond issue are also creditable to his heart, but they do not furnish an excuse. The criticism of "politics" must be based upon this lack of sympathy and helpfulness by public men, and political parties toward the several economic movements in our state. What is the remedy? It lies in the people themselves. The people have such office holders and such legislators as they deserve, and if we have legislatures which are unmindful of their duties to the people, it is the fault of the people who nominate them and elect them. There never was a man who held a public office who was not regardless of the sentiments of his constituents. If the people fix high the standard of public duty, and insist that those whom they elevate to positions of trust shall live up to that standard, there will be an immediate response, and a rejuvenation of political parties.

We must educate the people upon the subject of public roads. This good road propaganda must be maintained and promoted. Less than twenty years ago, more than twenty out of every hundred of our white population above ten years of age, could not read and write. We had neglected our duty to the children of the state, and we had fallen behind. Then came those two matchless champions of the rights of the children, Charles D. McIver, now gone to his reward, and Edwin A. Alderman, since come to the full stature of manhood, who went out among the people to preach the gospel of public education. Many of us enrolled under that standard, most conspicuous of whom was the great educational governor, Charles B.



Four and One-Third Per Cent. Grade on the Lenoir and Blowing Rock Turnpike. Beautiful Water Falls May Be Seen on the Mountain Side

Aycock, and we have established among our citizens such a standard of duty to the children that we are engaged in building a new schoolhouse day by day, and raising the standard and compensation of teachers, lengthening the school term, and bringing the children into the light of knowledge and liberty.

State Road Work in Maryland

By HON. W. W. CROSBY, Chief Engineer State Roads Commission of Maryland

During 1910, Maryland carried on more modern road work than any other state of the Union when the relative figures for population, area, and taxable basis are properly considered. We had outstanding in that year, as a maximum, nearly four million (\$4,000,000) dollars worth of contracts or arrangements for road improvement. These covered a great variety of work including simply grading, bridging, and draining; and the same with the addition of surfacings of gravel, oyster-shells, water-bound limestone and trap rock macadam, pitched macadam, vitrified brick, sheet asphalt and stone block pavements. There was also included some rather extensive bridge construction, such as a 200 foot reinforced concrete bridge (contract price \$10,000) whose steel work was designed as a cantilever, and another, for which the contract price was \$50,000, and which was 310 feet long and 60 feet wide, with three circular arches. For what it may be worth, the statement may be made that the average cost on the mileage basis of the above work is about \$10,000, but this audience knows only too well how misleading such a statement can be.

To those so familiar with the best of modern road and street work in detail, it is probably sufficient for me to call attention to only those details of the Maryland work that may be of interest from novelty or especial emphasis. In the first place, the state of Maryland not only furnishes state-aid to the counties to the extent annually of \$200,000, met by an equal sum from the counties themselves, but also is expending \$50,000 per year in the reconstruction of the old Baltimore-Washington Road, and further is expending, at the rate of about one million dollars per year, a state loan of six million (\$6,000,000) dollars for improving a state wide system of main highways, which as selected, covers about 1200 miles of road. Of this \$6,000,000, one million is required to be spent within the city limits of Baltimore, thus accounting for the pavement work mentioned.

In the work of grading, bridging and draining, there is perhaps nothing particularly of interest to the readers of Southern Good Roads. The maximum grade is not a hard and fast figure, though every effort has been made to keep it to six per cent. There are instances, however, where as high as nine per cent will probably have to be allowed. Except sand or pavements, the minimum grade for the water channels is seldom allowed to be less than one per cent.

The width of the grading is seldom, if ever, less than 24 feet.

Considerably less fencing is done than practiced in many states, though the yearly amount is gradually growing. All bridges and culverts are of substantial character, i. e., of vitrified clay, cast iron, brick, stone or concrete masonry, except in the case of a very few long spans (of several hundred feet) where conditions seemed to require the use of steel trusses with wooden floors. No wooden culverts are built, but a few experiments have been begun with corrugated iron.

So with this public road problem. We must not depend entirely upon Dr. Pratt, or upon the officers of the North Carolina Good Roads Association. They cannot assume the entire burden; we must find progressive young men of intelligence and loyalty to duty, and send them out also to preach the gospel of good roads.

State Road Work in Maryland

By HON. W. W. CROSBY, Chief Engineer State Roads Commission of Maryland

All the gravel surfacing so far has been of the ordinary screened gravel macadam. A considerable quantity of oyster shells are used for outlying sections of country road where the saving in their first cost under that other material seemed to justify such action. It is found that very satisfactory results are secured and their maintenance has not as yet proved excessive. The shells are used exactly as is stone; rolled, watered, and "bound" with sand.

Sand-clay and marl surfaces have also been laid but have hardly proved satisfactory. It is entirely possible that the dissatisfaction resulted entirely from the improper selection, by the local authorities, of the locations for these surfaces and that in many other localities they would prove most satisfactory.

Notwithstanding a popular opinion that seems to have become rather widespread, to the effect that the water-bound macadam, or the "McClintock," road surface is a thing of the past, a very considerable portion of Maryland's road improvement consists, and is likely to for some time yet, of such surfacing. It is found to be apparently more economical and satisfactory under local conditions to construct water-bound macadam, and then to maintain it, using surface treatments of bituminous materials, than to use either the mixing or penetration method at the start.

It is my belief that were the facts clearly available, it would be found that the same conclusions would be reached in many cases outside of Maryland, where the tendency now seems to be to ignore the valuable method of surface treatment.

The standard macadam is 14 feet wide and 8 inches thick after rolling.

Our brick pavements are all being laid on a concrete base, and, in the main, according to the specifications recommended for first class construction by the National Paving Brick Makers' Association. We have added one clause which appears to me of importance. We require that the variation between the individual brick in the rattler test be not more than ten points, which we think will result in a pavement wearing more uniformly and consequently more satisfactorily, and longer. For 1911, we shall probably omit references to "modulus of rupture" and "absorption."

Our sheet asphalt specifications call for usually a two inch wearing surface on a "close" binder course. The clauses covering the asphaltic cement follow those of Kansas City. They do not impose a "ductility" test, as that seems to us to be unnecessary, if it does not actually limit competition and increase the first cost.

Our stone block pavement specifications call for the most modern type of blocks, and one-half inch joints, pitch filled. The concrete base may be laid as such concrete usually is, or it may be laid as macadam grouted with mortar.

After this rather hurried resume, merely "hitting the high points," and given mainly for the purpose of inviting your attention to the extensiveness of the

Maryland work, I feel it may be of interest to you if I occupy the remainder of my space with some details of the bituminous work under my observation in Maryland.

The actual use of bituminous materials on Maryland roads dates back to about 1904, when Tarvia was first tried with about the usual results. Since then the variety and extent of this kind of work has increased annually until, in 1910, probably two million square yards of our roads were treated in one way or another with over twenty different pitch compounds.

A great deal of this work was in the line of surface applications. Most of the remainder of the work was by the Penetration Method. This latter method seems to be the most satisfactory for use in construction under our local conditions and the uncertainties of the arguments against it yet remaining.

One or two instances of the local use of the Mixing Method have come under the speaker's observation, but none as yet under his direct supervision. One of the instances referred to occurred in the fall of 1910. The Park Department of Baltimore City covered a solid, but uneven, Park road, which carried a great deal of traffic, with a three inch coating of heated stone mixed with a specially refined tar. Early in the winter following, the surface went to pieces, the tar apparently being too brittle to withstand the shocks and strains of the traffic.

Not being connected directly with this work, I am unable to state whether or not the failure was due to overheating of the stone, improper character of the pitch, other causes, or a combination of these. The instance is mentioned mainly because of its general interest and because I agree heartily with those who have maintained that as much, if not more, is to be learned from records of failures than of successes, and that "a wise man learns from the experiences of others; any fool can learn from his own." I hope later to secure more definite information as to the facts in this particular case.

In the use of the Penetration or Grouting Method, one or two points stand out as critical ones and on which are based some of the most serious arguments of the opponents of this Method against it. The points, I feel, can be readily reduced by practical work and carefulness to such fine and theoretical dimensions as to abolish entirely their serviceability as foundations for stable arguments of any such character. They are the following:

1st. The frequent lack of uniformity in the application of a pitch by sprinkling or pouring as ordinarily practiced, accounted for by (a.) the lack of uniformity in the surface receiving the pitch, and (b.) the lack of uniformity in the application of the pitch itself.

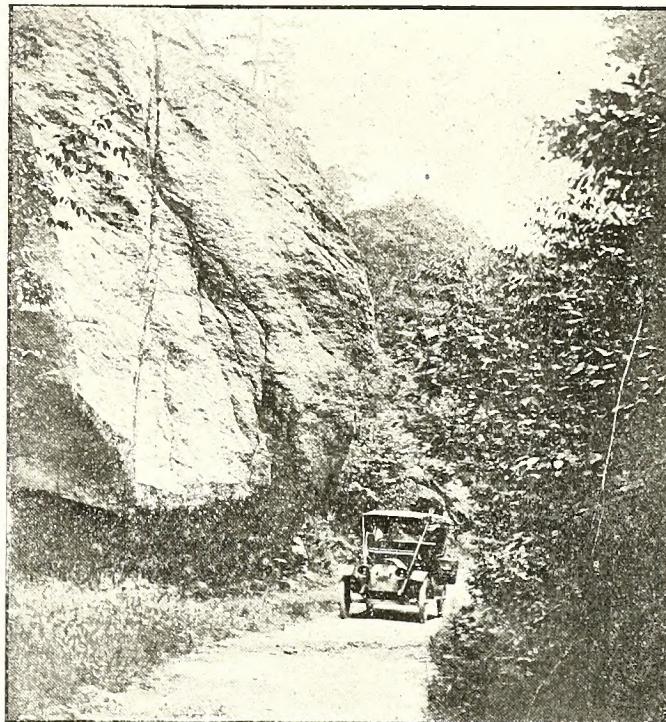
2nd. The bleeding or sweating of the pitch to the surface of the road, generally resulting within a year.

In considering these points preparatory to showing how fine and unfit for bases of arguments against they may become, it may be well first to call attention to a few general principles.

Pitch is added to macadam in order to replace a weak and unsatisfactory cement with a stronger and more elastic one. It is also used on top of macadam (when the latter becomes merely a cheaper form of concrete base) to form an imitation sheet asphalt pavement. Information of sufficient age, definiteness and reliability is not yet recorded so that a proper definite relation between the values of the two methods can be established. If, however, the object to be attained by the work consists in having result a surface of clean macadam with the mosaic of the stones exposed and simply their interstices filled with pitch, then a pitch

that will later bleed may be objectionable, and the selection of a pitch that will neither bleed nor be brittle, as well as care to avoid the use of it in excess, becomes imperative.

In such work also uniformity of application of the pitch and uniformity of the pitched surface are most important. The experience of my department is, however, that sufficient uniformity of application can be had by careful hand pouring. Such mechanical devices as have been available to us have not been as satisfactory as hand work, nor in general, as economical. Possibly the use of a proper pressure distributor might in some cases be justified. My experience also is that



Scene on Grandfather Mountain, 4,000 Feet Above Sea Level,
Yonahlossee Turnpike

a slight variance in the application of the pitch may remedy itself under subsequent traffic and weather conditions, and is not as serious a matter as a variance in the receiving surface.

Where the stones of the macadam are to be themselves exposed to traffic variation either in their uniformity of size or degree of compaction before receiving the pitch is a most serious matter, and one to be strictly guarded against.

Even when practically perfect screening of the top course of stone is had, if the stones are small sized, their compaction after rolling will vary considerably and this variation will be in inverse ratio to the perfection of the screening.

I have found in my work that the variation in compaction of the stone decreases as the size of the stone is increased, provided the difference in size of minimum and maximum is not too great, and I consider this latter important.

In other words, where a pitch filled, exposed stone mosaic surface is desired (an ideal surface in many instances) the use of clean "number ones" in the top course of the macadam and proper pitch for grouting will give excellent results with entirely satisfactory ease and uniformity.

When the object of the work is to secure a carpet of pitch and mineral matter over the surface of the ma-

cadam itself, as is perhaps the more usual practice, the bleeding of the pitch is not generally a serious matter when care is had in the amount of pitch applied, nor one that cannot be readily and cheaply offset subsequently if necessary on account of deficient care in the quantity used or of inferiority in the quality of the pitch itself. Further, in such cases, a certain amount of bleeding is frequently desirable to secure better results, when circumstances have interfered with or prevented desirable practices during the work, such, for instance, as the highest degree of uniformity of application.

A greater non-uniformity of receiving surface can also be permitted when a carpet is to be the result, provided the variance is kept within reasonable limits.

In other words, where a carpet of pitch and stone chips, gravel, or sand is desired as a result, the use of a pitch that will bleed or sweat moderately and of ordinary macadam construction up to and including the rolling of the No. 2's will give excellent results with entirely satisfactory ease and uniformity.

Thus, I believe, is shown the way in which the main objections noted to the use of the Penetration Method can be whittled down to such fine theoretical points as to render them too unstable as foundations for serious arguments against such work.

The penetration work that has been done in Maryland has seemed so far to be, with one exception, uniformly successful, at least, from the standpoint of the physical results. The time is as yet too short since its performance to enable final judgment to be passed on the value, from an engineering standpoint, of the solutions of the problems presented.

Some of it is three (possibly more) years old, so that the above statement is made with full consideration of some, at least, of the maintenance features. The exception above mentioned to the successes may teach a valuable lesson. In this instance, a heavy asphaltic oil (Texaco and Gulf) was used on a considerable stretch of resurfaced trap-rock macadam. With the exception of an area of 1200 square yards on which, by accident, the pitch was applied at the rate of about 5 gallons per square yard, the application averaged about $1\frac{3}{4}$ gallons per square yard. The pitch was supposed to be "70 per cent asphalt." Its analysis showed a loss on evaporation for 21 hours at 105 degrees C. of from 2 to $12\frac{1}{2}$ per cent and penetration of this residue exceeding at 4 degrees C. 50, and at 25 degrees C. under 120; loss at 170 degrees C. (5 hours) 4 to $16\frac{1}{2}$ per cent. Penetration of this residue at 4 degrees C. exceeding 30 at 25 degrees C., under 100. Paraffine—less than 1 per cent.

This material acted satisfactorily after its application in the summer of 1909 until the middle of March, 1910, when "soft weather" conditions prevailed for a week or ten days. For the first half of this period, everything seemed to be all that could be desired in the way of a road surface when suddenly the whole surface churned up into a slimy mud, perhaps two inches deep on top of the macadam. It might have been said, for clearness, that after its application, the pitch had shown an ability to rise somewhat and, with the stone chips and screenings spread over the surface, to form a "carpet" perhaps an inch thick, where the application averaged $1\frac{3}{4}$ gallons, and three inches where the five gallon application occurred. Strange to say, the mud did not occur on the latter section. This mud afterward ironed out into a carpet again and the road did fairly well through the spring, summer and fall of 1910. Some defects in the shape of waves in the surface appeared during the latter part of the summer and it was noticed that during warm weather there

was some increase needed in the "tractive effort" on this material, more especially on the heavily treated section.

During the mild and wet weather of the past winter (January 8th to 15th, 1911) the same muddiness of surface, as in March, 1909, occurred. It seems evident that the resurfacing of this section of road will be necessary during 1911.

I have noticed in many cases similar muddiness resulting from the use of lighter oils as Surface Treatments on stone and gravel roads under similar conditions of weather and traffic. A reason for the excessively treated section's not churning into mud may be that more or less accidentally "inherent stability of the mineral aggregate" was there had.

Another point in connection with Maryland work, and perhaps related to the foregoing, appears. Local weather conditions so differ from those of some other states as to require consideration of a higher temperature in summer and, while of a more moderate degree of cold in winter, of the fact that during a very large portion of the latter, the Maryland roads are subjected to comparatively intense traffic when unprotected by a coat of snow. Also that, during this period, natural conditions are extremely favorable to render road surfaces slippery. Consequently any pitch having characteristics that aid natural conditions to produce such a result, or add to their effects, have objections to their use.

We have found that in every case of, for instance, a tar whose residue, after evaporation at, say, 105 degrees C., shows a penetration at 4 degrees C. of less than, say, 10, the resulting surface will be objectionably slippery in cold weather, while those tars showing free from this objection.

One conclusion that we therefore have reached regarding pitch compounds for penetration work in Maryland is that they must give residues after the test for evaporation (21 hours at 105 degrees C.) whose penetration is not less than ten at 4 degrees C., nor more than, say, 100 at 25 degrees C.

The first cost of our bituminous work has varied from $2\frac{1}{2}$ cents per square yard for surface treatments to 75 cents per square yard for the Penetration Method, but with this statement, there should be coupled the caution—perhaps unnecessary to the majority of readers of this Magazine, though probably advisable for some, that such figures of "first cost" by no means give a clear idea of the "expense" of such work. The expense can only be arrived at after a considerable period of yearly service of the work, and after consideration of other facts—such as traffic records—inseparably connected therewith.

I doubt the wisdom of going further into details of the Maryland work at this time. Those whose interest in it is sufficient to warrant such labor on their part can secure further information from my writings previously published, or I will be very glad indeed to answer, as best I may be able, any questions. Suffice it for me to state that the foregoing merely touches on the immense work the state of Maryland has planned and in which the I believe she is making progress that is creditable to her historic record.

The city of Muskogee, Okla., has let a contract for gilsonite paving amounting to \$30,000.

Calhoun county, Ala., has started a campaign for a bond issue of \$300,000 for road building. The election will be held November 15.

The American Association For Highway Improvement

Definite arrangements have been completed for the first annual convention of the American Association for Highway Improvement and congress of all affiliated organizations to be held in Richmond, Virginia, November 20 to 24.

Leading men from all parts of the country including railroad presidents, distinguished engineers and highway officials are to be present at the convention and it is expected that it will prove to be the greatest road congress ever held in the United States.

President Taft has consented to deliver an address on the improvement and maintenance of highways and the date of the meeting has been changed from October 30 to November 20 to suit his convenience.

Arrangements for the convention of the American Association and its allied organizations are being made under the direction of Logan Waller Page, Director of the United States Office of Public Roads, who is president of the association; W. C. Brown, president of the New York Central Lines, who is vice-president; Lee McClung, treasurer of the United States, who is treasurer; Louis Hill, president of the Great Northern Railroad, who is chairman of the Board of Directors; W. W. Finley, president of the Southern Railway Company, who is a member of the Executive Committee; and, J. E. Pennybacker, Jr. the Secretary of the Association.

Railroads which have been sending road exhibit specials to various states will make Richmond the terminus for all such trips and the exhibit trains will form an interesting feature of the congress. On these trains will be exhibited miniature models operated by electricity and showing the various types of road machinery in operation and accurate reproductions of all types of road. Lectures will be delivered from many of these trains and there will probably be a great stereoptican exhibition in the open air the lantern slides showing the effects of good roads and bad roads, the manner in which doctors are held up on their way to patients because of ruts and mud and the way children are in danger of accident in bad road sections.

One of the most interesting features of arrangements that are being made is the plan for a good roads week throughout the United States just previous to the holding of the good roads congress. Thousands of public schools will hold special exercises and emphasize some of the principles of road building and maintenance. Efforts will be made to have the teachers give short talks on the benefits of improved roads to children and prize essays will be written and the best essay will probably be printed in the program and will be distributed at the convention.

Another interesting feature will be the actual work of improvement on hundreds of roads throughout the country during good roads week. Individual co-operation will be urged so that many hundred thousand men will donate their services to work on roads just prior to the holding of the Richmond convention. What was done in Iowa by the farmers where by the use of the split log drag a road was improved from one end of the state to the other, will be done in nearly all of the states of the Union during good roads week. The farmers will be urged to show their interest in some one section of road in this period.

Many pastors of churches in various sections have

already consented to urge upon their congregations the importance of good roads during good roads week and every other influence will be utilized to forward the movement.

Under the auspices of the Touring Club of America which is to take part in the good roads congress at Richmond automobile tours are being arranged from every section of the country including cities as far away as Chicago and Boston. It is expected that not less than a thousand automobiles will be gathered at Richmond on October 30 when the congress opens.



HON. J. E. PENNYBACKER, JR.
Secretary American Association For Highway Improvement

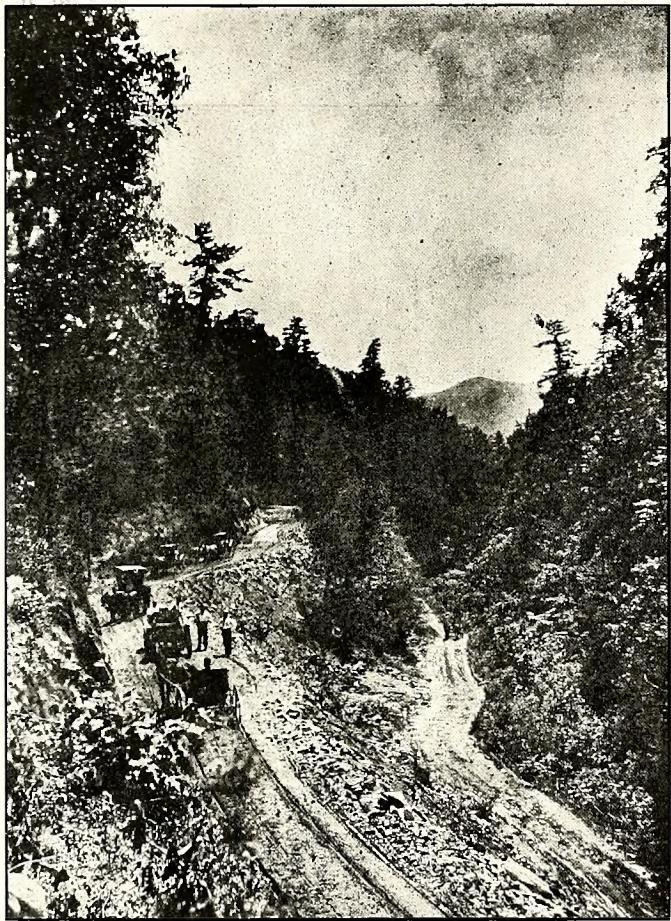
Automobile companies, manufacturers of road material and road machinery have already asked for space to exhibit their products in the state fair building which has been secured for the exposition feature of the congress. The meetings are to be held in the auditorium of the Jefferson Hotel and the large city auditorium which seats several thousand people.

The exposition feature of the convention and congress has aroused tremendous interest among all manufacturers of road machinery and road material, automobileists and all business men. It is realized that every interest connected even remotely with the movement for improving the roads of the United States will be represented at the convention and manufacturers feel that it is the first time that all the interests concerned in good roads will be gathered in one city where they can meet and exchange their views.

Great significance attaches to the first annual convention of the American Association for Highway Improvement and its allied organizations because it is believed that the event will mark the climax of the efforts of farmers, railroad men and automobileists as well as

the United States government to give this country an adequate system of improved highways.

The American Association for Highway Improvement was formed in Washington November 22, 1910 by leading men of the country including Mr. Page, Mr. Hill, Mr. McCullough and Mr. Brown as well as B. F. Yoakum, Chairman of the Frisco Lines; Dr. E. J. James, president of the University of Illinois; James McCrea, president of the Pennsylvania Railroad; Bryan Lathrop, Lincoln Park Commission, Chicago; John Goodell, Editor of the Engineering Record; Walter Page, Editor of World's Work; Leonard Tufts, president of the Capital Highway Association; Lafayette Young, former United States Senator from Iowa; W. W. Finley, President of the Southern Railway; James



Relocation of the Lenoir and Blowing Rock Turnpike. Climbing the Mountain Toward Blowing Rock, North Carolina

S. Harlan, Interstate Commerce Commissioner; Alfred Noble, Past President, American Society of Civil Engineers; and a number of other prominent men.

Since the American Association was formed scores of other road improvement associations throughout the country have joined as associate members the number of such affiliating organizations including the Ohio Good Roads Federation; Capital Highway Association, embracing the Atlantic Seaboard; the International League for Highway Improvement, with headquarters in New York; the Arkansas Good Roads and Drainage Association; New Santa Fe Trail Association; Good Roads Club of Georgia; Gulf Coast Good Roads Association; Montana Society of Engineers; Southern Appalachian Good Roads Association; North Carolina Good Roads Association; South Carolina Good Roads Association; Oregon Association for Highway Improvement; Indiana Good Roads Association; Aroos

took County Good Roads Association of Maine; Southeastern Kentucky Good Roads Association; Knox County Good Roads Association; and the Memphis-to-Bristol Highway Association.

President Taft has shown his strong approval of the purposes and character of the association by accepting an invitation to become a regular member. He announced his acceptance of the invitation to join the association in the following letter to President Page:

"My dear Mr. Page:"

"I am much interested in the work of the American Association for Highway Improvement, and I am in full accord with its aims and purposes. I consider the lines on which the association is working to be thoroughly sound, and with such men as you have associated with you much should be done to better the conditions of our public roads.

"It gives me much pleasure to accept the kind invitation extended by the Board of Directors to become a member of the association.

"I wish the organization every success in its splendid work.

Sincerely yours,

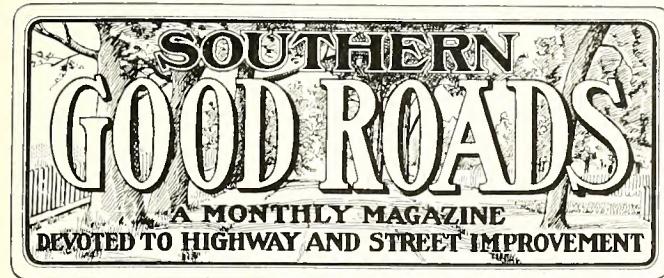
(Signed Wm. H. Taft.)

The president has been invited to address the Richmond convention and if the condition of his legislative program in congress permits him to leave Washington at that time he will accept the invitation. Other men of national prominence will be among the speakers and the platform will be crowded with men of national and even international fame. That the convention will be a pronounced success is already assured by the hearty co-operation of the U. S. Office of Public Roads which will have one of the largest exhibits and the Smithsonian Institution which has consented to exhibit its models showing the progress of the means of transportation from period to period in the history of the world.

The American Association for Highway Improvement which is holding the convention and the congress of its allied organizations was formed to act as a clearing house to all existing organizations working for road improvement and maintenance and to correlate their work. It is believed that the convention and congress at Richmond will offer an opportunity for a full and free exchange of ideas which should give strength and impetus to the work now going on in all of the states.

Largely as a result of the systematic campaign that is being waged by the American Association there has been a great revival in road improvement all over the country and as much as \$1,000,000 a day is being spent for road improvement at the present time. The Association is aiding all its allied organizations in preaching the economic importance of improved roads and is helping to form hundreds of new organizations in localities where the road improvement campaign has not yet permeated.

It will be shown at the convention that by improving 20 per cent. of the roads of the United States almost the highest point of efficiency would be reached and an annual saving of between one half a billion dollars and a billion dollars, would be affected each year. President Page estimates that certainly not less than one half a billion and very probably a billion dollars would be saved in the reduced cost of transportation of crops and other products throughout the country and the saving in the wear and tear on wagons and carriages and automobiles and the increased usefulness of horses and mules. Mr. Page figures that the increase in land values alone will pay for all road improvements.



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Official Organ Southern Appalachian Good Roads Association

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Official Organ of the South Carolina Good Roads Association

F. H. HYATT, President, Columbia, S. C.
FINGAL C. BLACK, Secretary, Columbia, S. C.

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AUGUST, 1911.

No. 2.

THE GOOD ROADS TRAIN.

The Good Roads Train now being operated by the Southern Railway Company is doing a world of good. It is impossible to estimate the good that it has already done in arousing the people of the south and it is going on triumphantly, winning new battles for good roads and all that good roads stand for, every day.

In North Carolina the Good Roads Train received an enthusiastic reception. At one place, Taylorsville, more than 3,000 people saw the exhibits and listened to the speeches. At North Wilkesboro hundreds of the leading farmers of that great mountain section gathered to hear the addresses of the experts.

Good roads associations are springing up in the wake of the train and these will help to carry forward the work which the government road experts have started. Alexander and Wilkes counties, neither of which can boast a foot of improved road, organized good roads associations and have gone to work with fire and enthusiasm that mean success.

The men in charge of the train know their business. Mr. W. J. Hurlbut, who represents the land and industrial department of the Southern, is an expert in his line. He is one of the best industrial agents in the business. The government is represented by Mr. L. E. Boykins and Mr. H. S. Fairbanks. Both of these gentlemen are road engineers of unusual skill and excellence. Both possess the happy faculty of being able to impart to others the things they know

and with their splendid equipment of models, stereopticon views, etc., they drive home to the minds of their hearers good road truths in a clear, cogent and convincing manner.

The Southern Good Roads Train is making history. It is giving impetus to a movement that is going to revolutionize the south within the next decade. In behalf of North Carolina and of the South, we extend to the Southern Railway, the American Association for Highway Improvement and the United States Office of Public Roads—the three agencies backing this great piece of up-lift work—our sincere thanks.

A CRIME.

It is a crime to waste public moneys, and the congress of the United States has been sinning against the people that elected its individual members from time almost immemorial. Millions have been wasted in public buildings, in improving worthless harbors and waterways. Recently it came to light that funds had been appropriated out of the treasury of the United States and had been spent to erect public buildings in western towns with populations ranging from 750 to 2,500. One Iowa town with a population of 1,300, secured an appropriation of \$75,000 for a public building. The representative in congress has come to look upon this sort of stealing as perfectly legitimate in every respect and all sorts of shady deals are made to secure the much-coveted appropriations to please the "folks at home." These same patriotic representatives who will literally "split their shirts" to secure a public building for Smith's Corners, or Brown's Cross Roads, look askance at any proposition that looks to the improvement of the roads of the country. It is millions for waterways and public buildings, but not one cent for roads, the crying necessity of the age. Their lack of interest in this vital question may be due to the fact that comparatively few of their constituents are deeply interested in securing good roads, but the fact remains that they do lack interest and that public funds continue to be frittered away in bolstering up the pride of petty municipalities and in providing unimportant harbors and waterways, to say nothing of the amount sunk in floating fortresses.

Here is an example of the wastefulness that all good men should condemn: According to the estimates of government engineers there has been spent upon the Mississippi river, including surveys, \$225,000,000 for the purpose of putting that public water highway in shape for the hauling of the products of the forests, farms and commerce tributary to it. The latest available statistics, published in 1906, show that there were transported on the Mississippi in that year 1,545,000 tons less than in 1889. This \$225,000,000 was spent between New Orleans and St. Louis, with the states of Mississippi, Tennessee and Illinois on the eastern boundary and the states of Louisiana, Arkansas and

Missouri on the western. It is evident that the farmers, lumbermen and merchants of these states that border directly on the river, to say nothing of the inhabitants of the other forty states, have received no benefit whatever from the expenditure of this vast sum. It has been wastefully expended, almost absolutely thrown away.

The same amount of money spent in building good roads would have revolutionized the country. Today the farmers of the states named are paying just as much for broken harness, broken wagons, losing as much time, wearing out as many horses and hauling as small a load, as before this tremendous sum was expended.

How much longer are we going to stand for it?

1861-1911.

Time passes and there are changes in all things except in our public roads. Recently we read the Life of Stonewall Jackson by Colonel Henderson and we were forcibly struck with the difficulties under which Jackson conducted his wonderful Valley Campaign. The author describes graphically the terrible condition of the Virginia roads and tells of impassable streams, washed out bridges, mud belly deep to the horses and up to the hubs of the artillery carriages, and we wondered at Jackson's military genius. That was nearly fifty years ago. A day or two later we read an Associated Press dispatch telling of the great celebration held on the historic field of Bull Run and fully two thirds of the dispatch was taken up with describing the difficulties encountered by the president of the United States in reaching the battlefield. Attempting to make the trip to Manassas by automobile, President Taft and his party encountered unbridged streams, roads that the heavy rains had transformed into rivers of mud, and practically every other impediment that confronted the gallant Stonewall Jackson half a century before.

Virginia has progressed in every way since the days of the Civil War, but this incident shows very plainly that she has no reason to be especially proud of the progress she has made in road building. Nor is the Old Dominion alone in this respect. The same thing may be said of North Carolina and of practically every other state in the south. With the exception of widely isolated counties and sections, the roads of 1911 are but little, if any, better than the roads of 1861.

THE GLIDDEN TOUR COMES SOUTH

Of interest to everybody along the line of the National Highway is the announcement that the great Glidden Tour, the biggest automobile event of the year, is to come south, covering the National Highway, from New York to Jacksonville. It was originally planned to make the trip from Washington to Montreal, but the contest board of the American Automobile Association, decided to send it south. The

automobilists will have the opportunity of seeing the south at its best—in harvest days—and the trip will be far more pleasing than if run over the bleak and barren regions of the frozen north.

The tour will be run in October, following the route of the National Highway from New York to Jacksonville, via the following cities: Philadelphia, Lancaster, York, Winchester, Staunton, Roanoke, Winston-Salem, Lexington, Salisbury, Charlotte, Spartanburg, Greenville, Anderson and Atlanta.

The best trade mark for any community is good roads.

Health, happiness, education, religion, morality—all will feel the quickening influence of good roads.

Bad roads are conducive of discouragement, back taxes, sheriff's sales, profanity, sore-heads and gourches.

The Tulsa, Okla., World, put the question neatly when it declared that the town is the heart of the community, the country the body and the roads the arteries by which they live. Good roads mean good circulation and good health.

Many a town has found to its hurt that it did not look good enough to the farmer to induce him to kill his team getting to it. Country life in many sections of the south means almost complete isolation four months in the year.

We would call the attention of the reader to the splendid paper in this issue on "Methods of Financing Good Roads" by Mr. P. D. Gold. We firmly believe that the plan which he outlines will be adopted in every state in the south within the next decade. It is financially sound, absolutely safe and without flaw anywhere, so far as we can see. The plan was submitted to the North Carolina legislature last session and it met with instant favor among the progressive members of that body. Unfortunately, the progressives were not in the majority and the bill was defeated.

Bad roads keep down land-values and smother progress. They make rural schools a failure and farm life drudgery. They discourage the raising of fine stock and encourage the use of archaic, ramshackle vehicles. They destroy local pride and make county and individual pride an impossibility. They encourage that which should not be done and discourage that which should be done. They lead through the "slough of despond" in this life and afford small opportunity of fitting one's self for anything better in the world to come. To paraphrase Goldsmith: "Ill fares the land—to hastening ills subjected, Where mud accumulates and roads are constantly neglected."

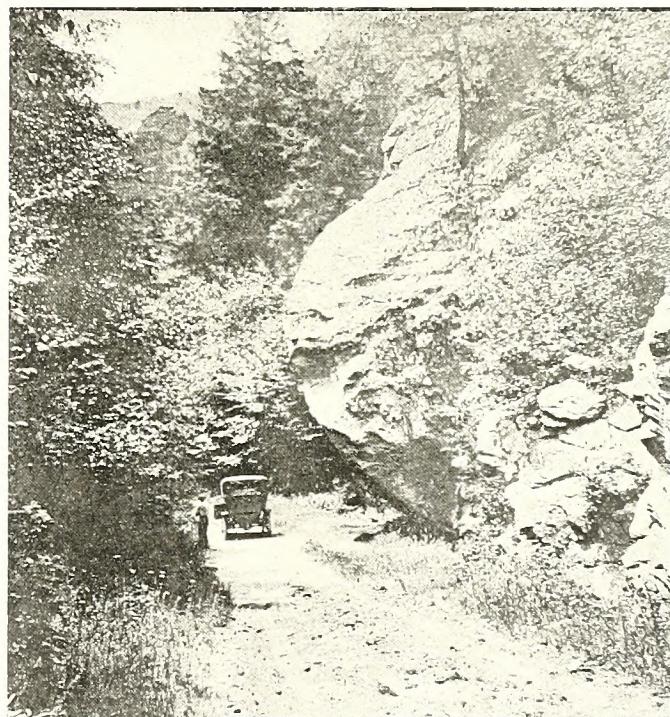
The Road Problem in the Light of Our Present Information

By MR. CLIFFORD RICHARDSON, Member American Society C. E. Consulting Engineer, New York

The solution of the problem of how to construct highways, roads and pavements, of types suitable for the varied conditions which exist and have to be met to-day is one of commanding interest and also of great difficulty, since the conditions which are now encountered, with the advent of the motor car and probable appearance of the motor truck and traction engine in numbers, are quite different from those with which we have had experience in the past. Into this problem a great many elements enter, all of which must receive careful consideration before success can be assured and an intelligent understanding obtained of the relative economy of different forms of construction under various conditions.

The first essential in highway construction is an accurate record and history of every road that is built, from the specifications under which it is constructed and the date and time of year when it was begun, until it has served its time of usefulness and has been replaced. This is very important owing to the fact that the success and economy of any form of construction can only be demonstrated by service test extending over a period of time embracing the life of the surface. The data should include the character of the subsoil foundation, the drainage provided and its location, if any, the original cost of construction and character of the materials used, the cost of maintenance during its life, distributed over particular portions of the road, the amount and character of the travel to which it has been subjected during that period, the cost of cleaning and of the replacement of the worn out surface, to which any other details of interest should be added. These data can only afford their full value for comparative purposes if they are collected and assembled by some uniform system. Mr. E. P. Hooley, County Surveyor of Nottinghamshire, England, one of the leading highway engineers of that country, has recently, in a paper submitted to the Second Irish Road Congress, stated that: "It is exceptional, if not unusual, in England to find that any records are kept in a surveyor's office, excepting that of the actual cash expenditure, or number of tons of material used on any road. He describes the road record which is maintained by him as follows: "Each sheet of the record book equals one mile of road and has 176 divisions forward. It is also divided into four main divisions, each representing $\frac{1}{4}$ of a mile and each $\frac{1}{4}$ mile is divided into 616 squares; each square represents 1 yard in width and 10 yards forward * * * *." A reference to this record in the office shows at once when any excess of material or repairs is being used or going on at any particular point. The necessity of accurate data in regard to the behavior of any road is recognized in England, but at the same time is as much neglected there as here. While there are data available in this country, they are in the most diverse and incomplete forms. Too often nothing is available or the figures are manifestly inaccurate, especially as regards initial cost. The Highway Commissions of Massachusetts, Rhode Island, New York and Maryland have collected and published data in regard to the cost of construction of various types of roads in those states, and have had a detailed census of the travel over them compiled at intervals, but a com-

parison of these data reveals the fact that they have not been collected on a uniform plan and are of less value for comparative purposes than they might be. In the same way the figures of English engineers and of the London Traffic Branch of the Board of Trade have been obtained on an entirely different basis and cannot be correlated with our own. The necessity of doing something in the way of systematizing such records, as well as the importance of keeping them, is apparent. The initiative in such a movement may well be taken by the Office of Public Roads, or by Committees of the Engineering Societies. If this is neglected a great opportunity for the collection of information of impor-



Scene on the Crest of the Blue Ridge Highway, the Old Yonahlossee Turnpike Between Blowing Rock and Linville, N. C. 4,000 Feet Above Sea Level.

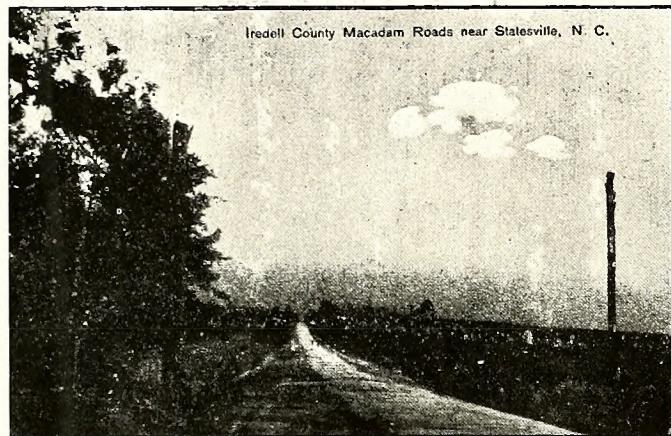
tance will have been thrown away and no adequate record of the return given for the expenditure of a amount of money in the past will be available. I have emphasized this in the early portion of this paper, as it seems to be one of the most serious matters to be considered in connection with the solution of the road problem, since the merits of any form of construction can only be determined by a knowledge of the cost of carrying for some fixed period of time a ton of traffic per foot run of the width of the road, and the cost of replacement of the surface when it is necessary to renew it. Mr. S. Whinery has discussed the subject in relation to street pavements, and what he has said is equally applicable to country roads, in a book entitled "Municipal Public Works," Macmillan and Co., 1903, which can be recommended to every highway engineer.

"The true cost of a street pavement, excluding all questions of the relative economy in use, and consider-

ations of beauty, comfort in use, etc., is made up of a number of items as follows:

(1) The first cost of the pavement. (2) The cost of keeping it in repair. (3) The cost of keeping the roadway clean. (4) The life of the pavement. (5) Interest charges on the sum invested. (6) Cost of renewal when the pavement is worn out. All these elements must be taken into consideration in order to determine which of two or more kinds of street pavement is, aside from other considerations, most economical. It will not do to base a conclusion on either the relative first cost or the relative durability (life) of the pavement alone.

As an example let us compare two pavements proposed to be used under similar conditions. We will assume that the street to be paved is a business street in one of the smaller cities, having a rather heavy travel. For the pavements to be compared, we will take a first-class macadam, as representing the cheapest in first cost, and sheet asphalt as representing one



Iredell County Roads, Near Statesville, N. C.

of the highest priced pavements in common use. While we have not the necessary data to give absolutely accurate figures, those given below may be taken as representing a fair average in American cities at the present time. Prices will, of course, vary in different localities with the cost of materials and with differing conditions under which the work must be done. Whether we accept those here used or not, they will serve to illustrate the correct procedure in determining which, under given conditions, is the most economical pavement to use.

Table illustrating approximately the relative ultimate cost per square yard per year of macadam pavement and sheet asphalt pavement under similar conditions:

	Macadam	Asphalt.
Probable life of pavement, years	6	15
1st cost of pavement per sq. yd.	\$1.10	\$2.40
Cost of maintenance in good condition during life	.60	.60
Interest on first cost during life at 4 per cent	.26	1.44
Interest on cost of maintenance at 4 per cent, assuming that this cost is distributed evenly over the life of the pavement	.07	.18
Cost of renewal with same kind of pavement at end of life	.60	1.40
Total	\$2.68	\$6.02
Annual cost during life of pavement per year	.45	.40

It thus appears, if our figures are correct (and they

are based upon present experience,) that while the first cost of the asphalt pavement is more than double that of the macadam, the ultimate cost of the first is materially less than that of the second."

Under modern conditions a macadam surface would not have a life of six years, and the contrast between such a surface and asphalt would be even more striking. The example serves, however, to illustrate the fact that the surface, the original cost of which is much smaller than that of any other, may eventually show an increased annual cost over a more expensive form of construction. This fact is not given the consideration by highway engineers that it ought to receive.

Another difficulty in connection with the solution of the road problem is the fact that so long a time must elapse before all the data which have been mentioned become available. The only method of determining the value of any form of road construction is a service test, and such tests must extend over a long period. With our modern forms of road surfaces of the best types no such data are possible as yet. In connection with bituminous broken stone roads our experience has extended over only four years at the most, and the majority of it over only two or three. In a recent paper by Mr. A. H. Blanchard on the "Present Use of Bituminous Materials in American Roadwork," he has given some data from which the following figures have been derived:

Extent of Bituminous broken stone road in miles, 15 feet wide, or 8,800 square yards:

	Asphalts and Tar.	Asphaltic Residuals
Penetration method.		
Laid in 1908	4.3	2.9
Laid in 1909	19.3	235.0
Laid in 1910	38.6	550.0
Mixing method	62.2	787.9
Laid in 1908	6.0	5.0
Laid in 1909	15.5	24.9
Laid in 1910	18.0	49.2
Total	101.7	867.0

These figures show how limited our experience has been with this type of construction. At the same time it is recognized that the only recourse we have for meeting the destructive effect of motor traffic is in the use of bitumen. Time alone will demonstrate what form of bitumen and what form of bituminous construction will give the most economical results in annual cost during its life. During the short period that has elapsed it appears that the asphalts, particularly the native asphalts, have shown the most satisfactory results. The tars have been used to a much smaller extent, and where used this has largely been a matter of economy, as they are by-products of industrial processes and very cheap. The same may be said of the petroleum residuum from oils that are not wholly asphaltic and contain paraffine hydrocarbons, having little or no cementing character. Both of these classes of bituminous materials are also very susceptible to high temperatures, those of our hot summer sun, which soften and raise it to the surface, necessitating the constant spreading on the surface of mineral matter to make it passable. Reasoning by analogy the superiority of the native asphalt is evident. They have been tried out for years in the construction of city pavements, for which purpose tar has proved a conspicuous failure, and for which the residuals containing paraffines have not even been suggested, as it is to evident that their use for this purpose would result in disaster.

From what has been said it is apparent that it is too early to advocate any particular form of bituminous construction. Mr. Blanchard's data show that the greater portion of this work which has been constructed in the United States has been done by the penetration method. No highway engineer has had a wider experience with construction of this type than Mr. T. Warren Allen, Engineer Member of the New York State Highway Commission. He has given his opinion in regard to it in an article in the Engineering Record for March 4th, 1911, in which he says, that while no one can predict the life of a bituminous macadam surface, he believes that if it is faithfully constructed by the penetration method, as practiced in New York State, "it will last as long as the sheet asphalt pavement where both are constructed with the same class of bituminous material." While the writer does not believe that the evidence will warrant such a conclusion, Mr. Allen's testimony is of value, owing to his extensive experience, in regard to such a form of construction. It will be noted, however, that in his comparison of such surfaces with sheet asphalt, he states that it applies only to bituminous broken stone roads which are constructed with the same class of bituminous materials as the sheet asphalt pavements; that is to say, with the native solid bitumens employed in laying the latter. This, of course, would exclude a comparison between the asphalt pavements and bituminous broken stone roads constructed with the inferior petroleum residuals or coal tar. It is interesting to note that Mr. Blanchard's data show that of a total of 960 miles of bituminous broken stone roads which were constructed during the years 1908, 1909 and 1910, 6.9 per cent only was coal tar used as the binding material.

Coal tar has been used widely as a surface application upon roads as a dust preventive and as a protective carpet. In England in 1909 over 600 miles of surface was treated with this material, but it appears that such a treatment must be renewed annually, or oftener, and it is recognized there that the use of tar is a temporary expedient and that something better and more lasting must be found. The great variation in the character of coal tar which is available, is partly responsible for the lack of uniformity in the results obtained. In England tar is of a more satisfactory character than that produced in the United States, and still even there it is far from being of uniform character. This is well illustrated by a statement of Mr. A. Brown, City Engineer of Nottingham, in a paper presented before the Royal Sanitary Institute in 1908. He explains the uncertainties in the use of tar as they have been brought out in Great Britain, and these, no doubt, apply equally well to the conditions found in America, although greater uncertainties and difficulties are existant here. He says:

"The last type of road is tar-macadam. There is nothing new in tar-macadam; it has been laid in this city for fifty years. The first piece of tarred paving in this country was laid on the London road about the year 1845.

"The material most favored for use in making tar-macadam is, iron stone slag, but I am certain that good results can be obtained by using certain kinds of granite. The advantage of using slag is that it is dry, and if the trucks in which it is delivered are sheeted down the material need only be slightly warmed before being treated.

"I have often been asked for my prescription, which when given has sometimes been used by the patient with peculiar results. It was not the fault of the prescriber or of the patient, but the fault of the drugs

used. There is nothing on earth which differs so greatly as the liquid called tar; good and poor qualities of tar are quite common, and chemical analysis, so far, does not always help you, and besides, the analysis of tar is rather an expensive matter, and unless you have every load analyzed you are not certain, and this analysis would add 50 per cent to the cost of your material. Tar varies in quality at different gas-works, hence the futility of giving prescriptions of "so much tar to so much pitch," which in another town, buying tar from another gas-works, would cause failure. But the same thing applies to tar from any works; it differs at the same gas-works at different seasons of the year. The tar from one gas-works is quite different to the tar from another works in the same town. A different method in carbonizing the coal, using a lower grade of coal, and very often a change in the management, alters entirely the nature of the tar and renders it unsuitable for tar-macadam purposes."

If such difficulties are met with in England, those which must be encountered in the United States, must be infinitely greater, since the illuminating gas tar which is produced here is an inferior article, owing to



The Macadam Road East of Statesville, N. C.

the fact that the coal from which the gas is made is inferior. It is heated to a very much higher temperature, the gas of poorer illuminating power being subsequently carbureted and enriched, the retorts in which it is produced being of the horizontal type, thus producing a tar high in free carbon or soot, and it is often mixed with water gas tar and other by-products of less value.

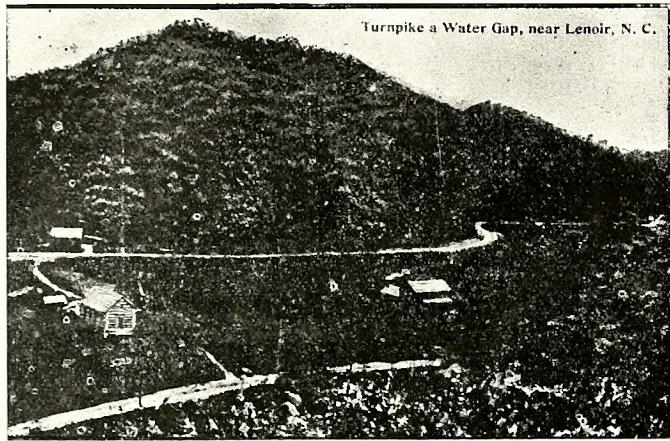
Recourse is now being had in England to the addition of native asphalt to the tar to improve its quality, and this is also the case in the United States. In some recent interesting experiments in the Borough of Bronx broken stone surfaces cemented with tar and with tar containing various percentages of asphalt residuals were constructed. After a period of only six months, the superiority of the work in which the binding material contained asphalt is already visible.

In a recent paper before the Second Irish Road Congress in Dublin, Mr. Seymour states, that in his opinion "the age of tar binding is rapidly passing," and adds: "The early advocates of tar were right in principle—bituminous binding—though wrong in the choice of bitumens. This brings us to the present time, which may be called the age of asphalt."

It is impossible, however, in the limited time available, to go further into the character of bituminous binders. The superiority of one or another form will be eventually demonstrated.

Another point in the solution of the road problem is the skill and care with which the work of construction is done. With the numerous demands for such work and the large mileage which is being constructed, we are unfortunately not supplied with highway engineers, with inspectors and with skilled labor sufficiently experienced to always arrive at the best results, even if the materials of construction are of the best kind. This may be recognized from the fact that if a number of cooks are given barrels of the highest grade flour, some of them would make better bread than others, due either to skill or experience. With greater experience in road construction in the United States, better results will be obtained.

We have been generally remiss in this country in our attention to maintenance, although now in a number of states satisfactory provision for it is made. This duplicates history in regard to municipal improvements. Mr. S. Whinney, in his book from which I have previously quoted, calls attention to the practice in municipal affairs. He says:



Turnpike and Water Gap, Near Lenoir, N. C.

"The idea seems to be somewhat prevalent among citizens and municipal officers alike, that when the construction of a public work is completed, it should remain in perfect condition indefinitely, and that all thought of provision for its care and maintenance may be dismissed from the mind. When some unexpected defect develops, it is noted with a feeling of shock and suspicion, and it is at once inferred that some one has failed in his duty and that the city has been defrauded." He adds:

"It will therefore usually occur that from the moment a public work is accepted from the hands of the contractor, and long before the effects of wear and tear begin to appear, expenditures for maintenance must be provided for."

Attention may also be called to the fact that the form of construction of any roadway should be suitable to its environments, the materials available and the quantity and character of the travel to which it will be subjected. It is useless to build a very expensive road where a cheaper one will serve satisfactorily. A sand clay surface may be all that is needed in many of our states where rock is not available, while at the same time on some of the main arteries of our eastern states, the most expensive form of construction will eventually prove the most economical. For example, where a Portland cement concrete foundation is once constructed, it may be regarded as a permanent asset and investment which will never need renewal, and upon which any type of surface can be placed when renewal is required.

The final point to be considered in solving the problem of road construction, is an appreciation of the fact that the mere appropriation of a large amount of money for the purpose does not end the matter. Nothing will last forever. All roads will wear out, and provision must be made for their replacement. One appropriation merely means that another will be required after a limited number of years, together with the cost of maintenance in the meantime. There has, as yet, been little or no realization of this fact in connection with city pavements and, perhaps, no more in connection with country roads. As an example I may cite the fact that the asphalt pavements in the Borough of Manhattan in New York, have been seriously criticised during the past winter because of their very bad condition. The public does not realize that a third of these pavements are from 15 to 22 years old and should have been replaced some years ago. They are at the end of their life. No provision has been made for a fund to carry out this work. The original surfaces were paid for by the sale of corporate stock or bonds, which have not yet matured. The city, therefore, is still in debt for its worn out streets, and finds it a problem as to how to replace them. There seems to be no realization of the fact that the construction of pavements and roads is, as Mr. Whinney stated in his book, "a purely commercial and engineering problem—the design of means to meet certain ends—and the whole treatment of the problem should be based on business consideration." This is certainly not the way the problem is being looked at today. The entire disregard and misunderstanding of the problem of the depreciation of roads and pavements with age, and of their replacement and provisions therefor, is hardly considered in a rational way in America to-day. It is one of the most important elements in the solution of the road problem. For a realization of the situation I cannot do better than refer all highway engineers to its exposition by Mr. Whinney.

One County's Experience.

After two years of road dragging with the King road drag, East Lampeter township, Lancaster county, Pennsylvania, finds that it has roads superior to the best it could produce under the old system, at an estimated cost of \$12 a mile a year for dragging. The average cost of maintaining dirt roads in Lancaster county is \$24 per mile. East Lampeter township has spent considerable money for culverts, has reduced its road tax from three and one-half mills to three mills and has the largest balance on record in its treasury—around \$1,300. The roads of East Lampeter township are now said to be the finest in the state, where formerly they were considered about the worst and well nigh impassable a good portion of the year. The good results secured by this township from the introduction of this method are due to the efforts of Dr. Donald McCaskey. He first began the use of the drag in his neighborhood on an impassable road. Although he had the consent of the supervisor board he was later forbidden to do the work, but he carried his case to court. Later he became a candidate for supervisor and was elected. With the co-operation of the farmers he began the use of the drag on the roads under his jurisdiction. Farmers were employed to drag the roads contiguous to their own land, payment being made at the rate of forty cents per hour.—Exchange.

Levy county, Fla., will hold an election in September to decide on an issue of \$100,000 of bonds for building sand-clay roads.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Arkansas.

In Arkansas there is marked interest in road-building. In Sebastian county practically all of the roads have been surfaced with gravel or macadam and arrangements are being made to make fifty miles of the road dustless, germless and sanitary. Such is the plan of County Judge Jesse H. Harp, who also is president of the Arkansas Good Roads and Drainage Association. He has purchased 125 ears of 75,000 gallons of residuum oil and the roads are being oiled as fast as possible. Residuum oil contains a certain amount of asphalt which serves as a top coating for the roads and resists hardest traffic.

California.

The great state of California continues to hold a prominent place in the eyes of the world. As all the world knows the state has a bond issue of \$18,000,000 ready for the building of good roads and progress is the key-note everywhere.

The good roads people of the nation never weary of telling of the wonders of Los Angeles county, California. About a decade ago the live wires of Los Angeles discovered that if they had good roads the farmers would flock in from all parts of the world and that the country would be developed. They went to work and secured bold issues and have been building roads rapidly since that time. They have already spent \$7,000,000 and they are still spending. Land has increased in value until now you cannot buy land twenty-five miles from Los Angeles at \$1,000 per acre. Taxable values have risen until Los Angeles leads every county west of the Mississippi and is within a very few thousands of dollars of the total value of the property of Cook county, Ill., in which is situated Chicago, the third city in the world in size.

* * *

Georgia.

In the Cracker State interest in road-building is at fever heat. No state ever experienced such widespread interest and enthusiasm. In his fine address before the Interstate Good Roads Association at Mountain Lake, Md., July 26th, Hon. G. Grosvenor Dawe, director of the Southern Commercial Congress, called attention to the following counties which are preparing to issue bonds:

Floyd county, \$500,000; Cobb, Lawrence and Randolph counties, \$300,000 each; Ware, \$250,000; Bibb, \$200,000; Macon and Tift, \$150,000 each; Decatur, Houston, Telfair, Wayne and Worth, \$100,000 each; Colquitt, \$85,000; Catoosa, \$40,000; Hancock, \$35,000.

One hundred and eleven counties in the state are working convicts on the roads and a number of other counties have asked for convicts and will be as soon as possible. The number of convicts at present employed on the roads is 4,715.

* * *

Kentucky.

The building of the Great Lincoln Way in Kentucky is attracting wide-spread attention. The various counties through which it is to run are vieing with one another in the construction of their particular links of the road and the result, so far, has been more than pleasing to those who are backing the project. War-

ren and Allen counties have made especially fine showings and Allen county has almost completed its part of the road. This has been brought about by the co-operation of all classes of folks in the county. The wealthy have given largely and those who are not wealthy have given as their means would allow. Many have worked for days on the road, giving their labor and the labor of their teams, free of charge.

* * *

Illinois.

A series of good roads conventions will be held at various points in Illinois during August to stimulate interest in the fourth International Good Roads Congress and Exposition to be held in Chicago September 18 to October 1. Arthur C. Jackson, president of the National Good Roads Association, and C. E. Bryan, general secretary, will be the principal speakers.

* * *

Missouri.

The state of Missouri offers a striking object lesson. Other states and communities should get the idea and avoid trouble. It is related that Smith county, Missouri, some years ago refused to authorize the issuance of road bonds, and the argument was that the \$100,000 of good road bonds issued by the neighboring county of Putnam were a burden to the people. Putnam, however, marched on unruffled and issued more bonds. The last census showed that Putnam county gained 2,000 in population while Smith county lost 450.

In Missouri a central highway has been mapped out, running from St. Louis to Kansas City. Governor Hadley toured the state with the pathfinders and made good roads speeches at every town along the line and wherever half a dozen farmers could be gotten together. Governor Hadley gave the "Show Me" farmers a new idea when he told them that "good roads are not an expense, but an investment." Much enthusiasm was aroused and it is certain that the highway will be built.

* * *

Mississippi.

The sentiment in favor of good roads in Mississippi is one that has been rapidly growing under the influence of progressive state officials and through the commercial instincts of city organizations that recognized the relation of good country roads to city trade. The road problem in Mississippi had, up to a few years ago, received very little attention. It then became suddenly acute, because of the removal of forest cover from vast areas. The apostle of good roads in Mississippi is Hon. H. E. Blakeslee, Commissioner of Agriculture of the State. He is credited with knowing more about the roads in Mississippi than any one else in the state. His recent address, delivered before the State-wide Immigration Convention at Gulfport made a complete survey of the problems of road construction and the progress that was being made. There are some portions of Mississippi remote from any satisfactory road material at all, while the upland portions are furnishing the very best materials for sand-clay roads. But in delta lowlands and in uplands alike the desire to have good roads as a commercial aid and as an evidence of civilization is constantly spreading, much to the benefit of the state.

Oklahoma.

The next three months will witness the beginning of the most extensive piece of good road and public highway improvement in the history of the state of Oklahoma, in Tulsa county. Good roads district No. 1 of Tulsa county, comprising seven townships and nearly 250 square miles, will be created by a vote of the residents of Tulsa county the first of September, and the county commissioners last month instructed the county clerk to advertise for bids for \$500,000 worth of good roads bonds. This half million dollars will be increased to nearly \$700,000, by the proper proportionment of the \$400,000 county good roads bonds recently voted in this county.

A few weeks ago the Tulsa County Good Roads association was organized in Tulsa and Arthur F. Antle, capitalist, farmer and president of the association, circulated petitions for the creation of Road District No. 1 and the voting of \$500,000 worth of bonds. In six days he secured the signatures of 873 Tulsa county tax payers, or 220 more than the number required by law, showing that the farmers and city residents as well, are heartily in favor of the proposition

* * *

Oregon.

Oregon is the first state to become so thoroughly aroused on the question of good roads as to make a special session of the legislature possible. Just now there is a movement on foot to have a special session called and it looks like it will succeed. Petitions are pouring in from all parts of the state. The biggest petition of the bunch is the one started by the Oregon Development League and it already has many thousands of signatures.

The aim of the petitioners is to have the Legislature act on this one question only, and the form of petition most generally adopted thus far specifies that the legislation be confined to the proposed amendment to Article 11, Section 10, of the Constitution of Oregon, authorizing counties to incur indebtedness for public roads after approval by a majority of those voting on the question.

"The immediate building of public highways throughout the counties is the most important yet the most neglected improvement at this time demanded by practically all of the people," declared the petition. "No other improvement would do so much to make country life attractive and profitable. And the people generally are unwilling to await the action of a regular session of the Legislature, or the coming of a general election."

* * *

South Carolina.

The spirit of the good roads movement has made itself felt in South Carolina during the last half of 1910 and first half of 1911, more strongly than ever before. Briefly, some of the projects are as follows:

Sea to Mountain Highway, three hundred miles long, from Charleston, through Berkeley, Dorchester, Calhoun, Richland, Lexington, Newberry, Laurens, Union, Spartanburg and Greenville counties, South Carolina; and Henderson and Buncombe counties, North Carolina, making Asheville the objective point.

The road passes through Summerville, Orangeburg, St. Matthews, Columbia, Lexington, Newberry, Clinton, Laurens, Greenville, Union and Spartanburg. The majority of this road is already completed and remainder is being completed as fast as men and money can do the work. It is expected to hold a big celebration August 7th, at which time the majority of the work will have been completed.

Orangeburg county has completed a fine system of sand-clay roads; Aiken county is constructing a fine highway between Aiken and Augusta, Georgia; Marion county is constructing a fine line of roads in cement gravel surface, securing the gravel in their own county and, according to experts, this gravel is the finest deposit in the coastal country. The Richland county roads are in excellent condition and are of the sand-clay variety. Sumter county will vote \$150,000 bonds on August 1st. All counties mentioned on three hundred mile highway are building roads in every direction, tapping the main line.

The space is too limited to name other counties that are engaged in the work, but bond issues will be placed in practically every other county in the State, before January 1st. The most encouraging feature of South Carolina Road Building is the fact that adequate means for maintenance is being arranged for, so that the money expended in construction will not be wasted.

* * *

Texas.

Jasper county is the most recent to get in line on the matter of good roads in southeast Texas. Under the auspices of the Commercial Club, the Ladies' Civic Club, and the Jasper Truek Growers' Association, a meeting was held on July 4th to arouse enthusiasm and start the agitation for petitions for a bond issue for the county. Jasper is a wealthy county, having many large lumber mills, and agriculture plays a prominent part in its business. Orange, Liberty, Chambers, Hardin and now Jasper county, have one by one fallen in line with Jefferson county from the impulse of the good roads movement started with the Jefferson county good roads association four years ago, and which has been nurtured and fostered by the Beaumont Chamber of Commerce and other live organizations in Jefferson county. It has been the experience of Texans that the good roads fever is highly contagious and that if a county becomes seriously affected with it, adjoining counties catch it. Texas is a mighty big state and it will take time for the good roads sentiment to reach every part of it, but it is coming.

From all accounts it is apparent that Texas is making good headway with the problem of establishing and maintaining good roads, and it is altogether probable that within the next few years it will be practicable to travel from east to west and from north to south over the entire state in either an automobile or any other character of vehicle used for road purposes.

Individual counties are taking up the matter of constructing good public highways and in most of the counties where they are most needed, a fairly good system of roads has already been provided. The idea is becoming popular, and other counties are taking it up, while the state, catching the fever, is getting in readiness to cooperate with the counties, and thus a splendid system of highways is almost assured.

* * *

Virginia.

When President Taft attended the big celebration held at Manassas last month the bad roads of Virginia secured wide publicity. The Associated Press sent out a long dispatch telling of the troubles our big president had in reaching the battle-ground and every paper in the nation copied it. He tried to make the trip by automobile and he found that the bottom had dropped out of the roads. Streams were impassable and there were no bridges anywhere. The party was delayed for hours and finally reached the scene entirely worn out, in a bad humor and completely disgusted with the roads of the proud "Old Dominion." How much bet-

ter it would have been if the newspaper men had been able to say that "the presidential party had a delightful trip, despite the heavy rains, over the fine macadam highway lying between Washington and Manassas." It would have been worth thousands of dollars to Virginia as an advertisement.

Roanoke has landed the annual meeting of the Southern Appalachian Good Roads Association, which met last year in Knoxville. The meeting is to be held in that city September 27-28 and there will be hundreds of delegates present.

On July 24th, the Touring Club of America started a road inspection tour in Virginia in connection with the American Association for Highway Improvement. This is the first tour of its kind to have the active co-operation of government and state officials. Acting director of the office of public roads, Mr. Paul D. Sargent, Mr. J. E. Pennybacker, secretary of the American Association for Highway Improvement, Mr. P. St. Julien Wilson, state highway commissioner of Virginia, and Mr. F. E. Elliott, of the Touring Club of America, are in the party. The object of the trip is to secure data as to highway conditions in Virginia and especially with respect to the building of a highway between Washington and Richmond, Va. The tour was started from Washington, Hon. J. S. Sherman, vice president of the United States, acting as official starter.

* * *

Washington.

The northwest is alive to the value of good roads. In a recent issue of the Seattle (Wash.) Intelligencer the statement is made that before the summer is over Seattle and Tacoma will be connected by a first-class macadamized highway. In King county, of which Seattle is the seat, there will be \$320,000 available, including state aid, for road improvement this year. Much of this will be spent on a trunk line destined to connect Seattle and Everett. From Everett to Tacoma an improved road is a matter of the near future. This road work is part of a general plan to build a trunk line from the northern to the southern boundary of Washington, which in turn will become part of a highway from the Great Lakes to the ocean, through the northern tier of states, and this will connect with another trunk line from British Columbia down the coast to Mexico—a dream of that wide-awake country that is certain to be realized in the next few years.

GOOD ROADS NOTES IN BRIEF

Bryan county, Okla., will vote September 12, on a bond issue of \$180,000 for road building.

The city of Paducah, Tex., votes this month on a bond issue for the improvement of certain streets.

The city council of Richmond, Va., has voted to provide a bond issue of \$1,000,000 for street work.

The city of Sumter, S. C., expects to have \$200,000 to spend on sand clay roads after this month.

Tulsa county, Okla., will vote in September on a bond issue of \$500,000 for road building.

Wichita county, Tex., has an election this month on a bond issue of \$200,000 for road construction.

Some very costly roads are being built in Maryland. From reports sent out from the office of the state highway commission it appears that last month \$60,650 was spent on 5 1/4 miles of road. For grading another road, 4 1/4 miles long, \$12,440 was spent.

The city of Cumberland, Md., is spending about \$15,000 on paving with fire brick.

The city of Maysville, Ky., has contracted for 20,000 linear feet of concrete sidewalks.

Bids are being asked for the construction of two miles of macadam road at Buchanan, Va.

Elmore county, Ala., has awarded contracts for the construction of 32 miles of sand clay and gravelled road.

Dallas county, Ala., has sold \$150,000 of road improvement bonds and will start construction at once.

Port Arthur, Tex., has \$70,000 to spend on street improvement.

The city of Bramwell, W. Va., has voted bonds for \$50,000 for street improvement.

Danville, Va., will spend \$30,000 in paving Main street and will improve a number of other thoroughfares.

Palatka, Fla., will spend \$15,000 on paving with vitrified brick.

Montgomery county, Md., will start road improvement with a bond issue just voted of \$12,000. This will be supplemented by a like sum under the Maryland state aid law.

McIntosh county, Fla., will vote on a bond issue of \$20,000 to start the work of road-building.

The city of Winston-Salem votes this month on a bond issue of \$75,000 for street work.

The hustling city of Americus, Ga., has awarded a contract for the improvement of streets amounting to \$250,000.

Charlotte, the "Queen City," takes the lead among North Carolina towns with a big bond issue for street improvements. Its mileage of improved streets is already formidable, but is to be largely increased. \$150,000 is to be spent for asphalt and bitulithic paving.

The city of Crowley, La., has awarded contracts for cement sidewalks on 260 blocks.

High Point, N. C., the "Grand Rapids of the South," has awarded a contract for street work amounting to \$40,000.

Rome, Ga., has made paving contracts amounting to about \$100,000.

Elmore county, Ala., has contracted for the building of 24 miles of sand-clay road.

District No. 4, Lincoln county, Miss., is asking for bids on 28 miles gravelled road. The contract will be let this month.

The state roads commission of Maryland will improve six miles of road from Baltimore to Towson at a cost of \$6,000.

Lowndes county, Miss., has organized a good roads association and started a campaign for a bond issue of \$300,000.

The city of Joplin, Mo., will spend \$60,000 on paving with creosoted wood blocks.

The Lynchburg, Va., Automobile Club, will improve 12 miles of road with slate at a cost of \$7,000.

The state highway commission of Louisiana is asking for bids on 33 miles of shell road.

Benton county, Tenn., has joined the good roads procession. The county commissioners are asking for bids on the construction of 85 miles of macadam road.

The city of Tampa, Fla., is asking for bids on a large amount of macadam work and the county of Hillsborough, in which Tampa is situated, is also preparing to do a great deal of good work.

The fine city of Louisville, Ky., will spend \$65,000 on asphalt paving.

In Bell county, Tex., precincts Nos. 4 and 5 have voted bonds for \$350,000 for the building of good roads.

McMinn county, Ala., has legislative sanction to issue bonds for \$300,000 to build 200 miles of sand clay roads.

In Meeklenburg county, Va., South Hill district has voted \$50,000 for road improvement.

The town of Lewisburg, W. Va., has decided to start a street improvement with a bond issue of \$16,500.

Gregg county, Tex., voted last month a bond issue of \$100,000 for good roads.

Beaumont, Tex., the thriving oil city, will vote this month on the issue of \$25,000 additional bonds for improved streets.

Laurens county, Ga., is preparing to take its stand alongside the most progressive counties in the Cracker State. It will vote on Aug. 30 on an issue of \$300,000 for road building.

Gainesville, Fla., votes September 5 on a bond issue of \$35,000 for street improvement.

Wayne county, N. C., will vote this month on a bond issue of \$200,000 for good roads.

Sumner county, W. Va., votes this month on a bond issue of \$55,000 for road work.

The town of Lookout Mountain, Tenn., has secured legislative sanction for the issuance of \$35,000 of bonds for street work.

Jackson county, Fla., will vote in August on a bond issue of \$300,000 for roads.

The town of Argenta, Ark., has contracted for street improvements to the amount of \$35,000.

The city of Austin, Tex., has made contracts for the laying of bitulithic paving amounting to \$100,000.

The county supervisors awarded last month at Collins, Miss., contracts for the construction of 29 miles of road.

Columbia, S. C., is experimenting with creosoted blocks for paving and has let a contract for \$15,000 of the work.

Dallas, Tex., will spend \$62,000 this month and next in bitulithic paving.

Caldwell county, Tex., has contracted for the building of eight miles of macadam road.

The District of Columbia has contracted for \$70,000 worth of cement sidewalks.

The city of Atlanta, Ga., will pave one block with brick.

Beaver Pond district of Mercer county, W. Va., will build 54 miles of macadam road at an estimated cost of \$200,000.

Greenbrier county, W. Va., is asking for bids on road work amounting to several thousand dollars.

Chester county, Tenn., will build several miles of gravelled road.

Duvall county, Fla., is asking for bids on a large amount of road paving.

The city of Norfolk, Va., is doing a great deal of street improving. Recently \$8,000 was appropriated for improving one boulevard.

Robertson county, Tenn., is asking for bids on 50 miles of road.

The city of Temple, Tex., will pave three blocks with graniteoid.

The county of Baltimore, Md., is asking for bids on a great deal of macadam road work.

In Gonzales county, Tex., Precinct No. 1 has voted \$150,000 for road building.

Trinity county, Tex., has voted \$40,000 for road improvement.

The city of Port Arthur, Tex., is to vote soon on a bond issue of \$80,000 for street improvement.

The Rosenberg district of Fort Bend county, Tex., has voted \$75,000 of bonds for road work.

The hustling city of Columbus, Ga., has voted \$40,000 for vitrified brick paving.

Louisville, Ky., has contracted for \$32,000 worth of asphalt paving.

Athens, Ala., will spend \$20,000 on street work. Sereven county, Ga., has contracted for several miles of sand clay road.

Americus, Ga., is asking for bids on 50,000 square yards of paving.

Fort Worth, Tex., will spend several thousand dollars on vitrified brick, asphalt and bitulithic paving.

Lee county, Va., one of the progressive counties of the western part of the state that voted a big bond issue a short time ago, has completed plans for an improved system of highways and is asking for bids for the construction of 189 miles of first class road.

Caldwell county, Tex., announces that 26 miles of road will be macadamized this season.

Shreveport, La., one of the most progressive cities of the south, will spend \$600,000 on street improvement. It will pave with wood block, vitrified brick, asphalt bitulithic and concrete and will have a system of streets second to none in the state when completed.

BRIDGES & CULVERTS

Jefferson county, Ala., is preparing to build ten steel bridges and the county commissioners are asking for bids.

Laurens county, Ga., will build a number of costly bridges and put in a great many culverts in the near future.

Colquitt county, Ga., is asking the legislature to allow the issuance of \$85,000 of bonds for bridges and culverts.

Appling and Toombs counties, Ga., are to erect a bridge across the Altamaha river, which separates the two counties.

Natchitoches Parish, La., will spend \$6500 on a bridge across Cane river.

Shreveport, La., will spend \$85,000 on a steel bridge across the Red River.

Baltimore county, Md., will build seven bridges in the near future.

At Statesville, N. C., a company has been formed to build a steel bridge across the Catawba river at Buffalo Shoals. This bridge is made necessary by the Central Highway, which runs through Iredell county.

Stephens county, Okla., is considering the matter of issuing bonds for \$60,000 for the building of bridges and culverts.

Muskogee county, Okla., will build a number of steel bridges this summer.

McMinn and Bradley counties, Tenn., spend \$32,000 on a bridge to connect the two counties, spanning the Hiawassee river at Calhoun.

Hamilton county, Tenn., will rebuild the bridge across the Tennessee river in the edge of Chattanooga at an estimated cost of \$250,000.

Perry county, Tenn., will build a bridge across Buffalo Bayou.

The city of Houston, Tex., has awarded contract for the building of a bridge across the Houston ship channel to cost \$305,900.

Dinwiddie county, Va., is asking for bids on a 204-foot bridge across Stony Creek.

Summers county, W. Va., votes this month on the issuance of bonds for bridge and culvert work.

Baxley county, Ga., is promoting the construction of a bridge across the Altamaha river, 600 feet long.

The state road commission of Maryland is asking for bids on the construction of a bridge over Nanticoke river between Dorchester and Wicomico counties.

Bibb county, Ga., has been authorized to vote on a bond issue of \$200,000 for the building of bridges, culverts and roads.

Hancock county, Ga., will build a steel bridge across Little Buffalo creek.

District No. 1, Lincoln county, Miss., is asking for bids on bridges and culverts along 28 miles of road.

Grenada county, Miss., will build a number of reinforced concrete bridges.

Polk county, Tenn., will construct a bridge across the Hiawassee river. The contract will be let this month.

Shelby county, Tenn., will build a half a dozen bridges and many culverts this fall.

Fayette county, Miss., has \$13,000 available for bridge construction.

Jefferson county, Tex., will build a bridge across the Neches river at a cost of \$65,000.

A bridge is to be built across Trinity river near Houston, Tex., at a cost of \$100,000.

Bids are being asked for the construction of two steel bridges in Spotsylvania county, Va.

The city of Bramwell, W. Va., has appropriated \$7,000 for building bridges and culverts.

Ouachita county, Ark., has contracted for the construction of a steel bridge across the Ouachita river, to cost, including approaches, \$52,000.

Pulaski county, Ark., is to build an 84-foot concrete bridge on Hot Springs pike, a few miles from Little Rock.

The commissioners of the District of Columbia are considering the erection of a bridge on Q street, across Rock Creek, at an estimated cost of \$275,000.

Santa Rosa county, Fla., will build several bridges at different points in the county.

The state roads commission of Maryland is preparing to build a bridge in Calvert county and a number of other bridges in other counties. One of these is a 640-foot bridge across the Nanticoke river at Sharpstown, to cost about \$52,000.

Tunica county, Miss., is preparing to build eight bridges and repair a number of others.

Clay county, Miss., is preparing to build a number of costly bridges.

A bridge is to be built across the Missouri river at Sibley, Mo., by the A. T. & S. F. R'w'y. to cost \$1,750,000.

The Board of Public Improvements of the city of St. Louis, Mo., is preparing to spend \$550,000 in building one bridge and its foundations and supports.

The Atlantic Coast Line railway is attempting a gigantic task in bridge building. It proposes to replace all wooden bridges along its line with steel and concrete structures and will spend \$3,000,000 per year until the work is done.

Fort Bend county, Tex., will spend \$50,000 in building two bridges across the Brazos river.

At an election at Teague, Texas, a bond issue to the amount of \$34,000 was carried, only 40 votes being cast against the issue.

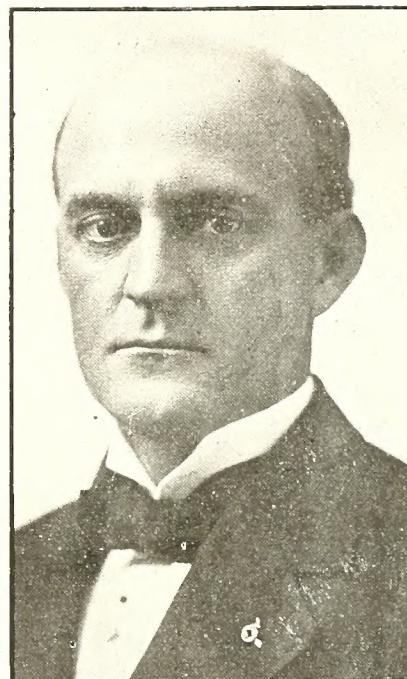
Governor Hadley of Missouri, hit the nail squarely on the head when he told the farmers of his state that good roads are not an expense, but an investment. As a paying proposition there is nothing on earth that beats a good road.

THE EXTENSION OF GOOD ROADS.

In order to illustrate the tremendous impetus which has lately been given to the nation-wide movement for improved public highways, the United States office of public roads has just prepared a chart which shows that nearly 15,000 miles of transcontinental, interstate and trunk line roads are contemplated in various parts of the country.

The chart shows to what extent the "good roads" movement has taken possession of the country. North, south, west and east, the improved roads, some lately planned, others actually under construction, literally make a net work covering the whole country.

If all the plans contemplated are carried out by the men and communities behind them, it will be possible to drive wagons or run automobiles from the Atlantic to the Pacific coast, from Vancouver, B. C., to Tijuana, Mexico; from Montreal, Canada, to Miami, Fla., and always over the modern macadamized highways.



HON. JESSE TAYLOR, Jamestown, Ohio
Secretary Ohio Good Roads Federation

Among the great trunk lines are noted the following: Ocean-to-Ocean Highway, 3,800 miles; Montreal-to-Miami Highway (exact length unknown); the Pacific Highway, 2,000 miles; the Park-to-Park Highway, 450 miles; the Memphis-to-Bristol Highway, 540 miles; the Lincoln Way, 150 miles; "Red-to-Rio" Highway, 600 miles; the Central Highway, 460 miles; the Dupont Highway, 103 miles; the Des Moines-Kansas City Highway, (exact length unknown); the Capital-to-Capital Highway, 1,500 miles; Clay-Jefferson Memorial, 1,200 miles.

Clay county, Tex., is to vote on August 5th on the proposition of issuing \$200,000 for bonds for building good roads.

The election voting \$200,000 for good roads in Cameron county, Tex., carried by a vote of 61 to 11.

Austin county, Tex., has voted bonds to the amount of \$175,000 for building the Austin county link of the Red River to the Gulf highway.

County Road Laws and Their Relation to Practical Road Work

By MR. W. S. FALLIS, Highway Engineer, Wilson, N. C.

The North Carolina Good Roads Association by its work, its influence, and the fact of its successful existence for the last three years, has done a great work in advancing the cause of good roads throughout the entire state; and I believe, its influence has—through the ability and untiring energy of its president and his co-workers, extended far beyond the state lines.

There is, however, one of the road problems that should receive careful attention. This problem has much to do with the success or the failure of the work, and it is the law and organization under which the county or township carries on the work.

From my own personal knowledge as a civil engineer engaged in road work, this is a large factor in the successful prosecution of all road improvement. The law under which the county or township works and the organization under which the work is done is of vital importance.

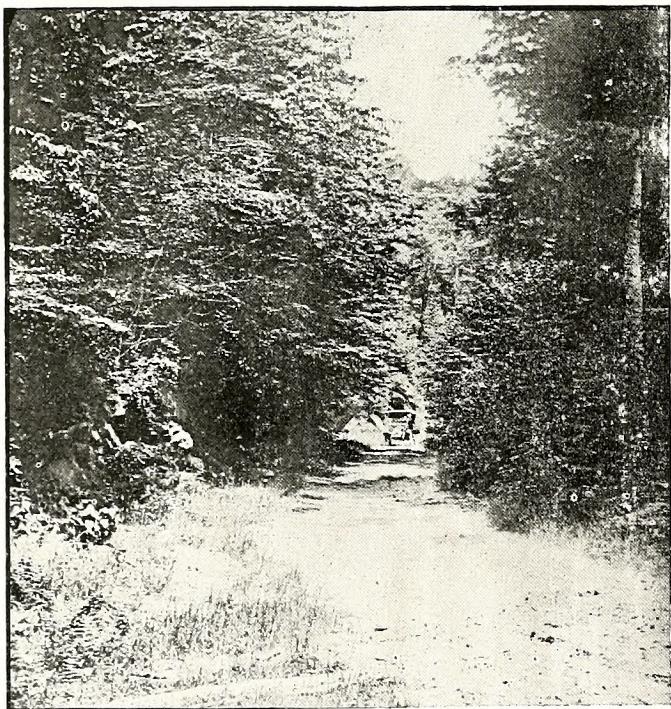
prosecution of the work very uncertain. I am satisfied that a number of the counties have similar provisions so far as the organization and prosecution of the work is concerned. These defects as seen from the view-point of the road builder, are only such as naturally result from having the laws written or compiled by a lawyer who has not had, and who could not be expected to have, any practical knowledge of the many difficulties met with by the engineer or the superintendent.

In order to relieve this condition, I suggest that all good roads advocates use their influence to have all road laws proposed for their home counties submitted to the highway division of the State Geological and Economic Survey or to some competent and experienced road engineer, for criticism—so far as the provisions concerning the engineer, the organization, the changes of location and the construction are concerned.

I should like to make a few suggestions along these lines. The value of having all road work free from political influence is, or should be, clearly understood and accepted by all those having to do with road work. We all know that money for public work is often wasted; but some of us do not realize and others could not be made to believe that, under proper management free from improper influence, every dollar of the public fund can be made to do as much as any other dollar. The organization for county road work should be entirely free from political influence in order to accomplish this.

I have in mind one county in this state which spent from six to nine thousand dollars, more than was needed for the work, this, arising from a cause, which, on the face of it, could hardly have been other than undue political influence exerted selfishly by interested parties. The engineer, after his qualification, his experience and his character have been thoroughly investigated and found satisfactory, should be given the decisive authority in all the work. His local locations should never be interfered with. He should employ, or his recommendations for the employment of the superintendent and others directly under his authority should be ratified by the county board. He should not be a local man, nor should he be a man of much local acquaintance or affiliation. It would also be very much to the advantage of the county to have the superintendent or foreman from some other section; but, in every case, be sure to secure a man competent and experienced in the management of the kind of work he is to do and the outfit you expect him to use.

The position of the engineer should be that of a permanent manager. This centralizes responsibility, while the growing familiarity of the engineer with the problems of the county will be of increasing value. The continual rotation in office of county boards render work directed by the best of them mere experiments, and expensive ones at that. The engineer should authorize the purchase of all ordinary supplies and recommend to the board the purchase of machinery and equipment needed. The superintendent or foreman should employ and discharge all the men and other assistance acting directly under his orders and no one should ever give instructions to any laborer or other



Road Scene on the Yonahlossee Turnpike, Between Blowing Rock and Linville, N. C.

Some of the laws enacted in connection with the bond issues of counties or of townships are of such character that economical organization and prosecution of work is almost, if not entirely, a practical impossibility.

There is to my knowledge at least one county in the state whose road law, made at the last meeting of the legislature, is of such nature that no engineer who has any regard for his reputation or the success of his work could afford to accept a position with the county; for under the provisions of its law successful work is impossible.

Another county has a provision in its law which is calculated to render the satisfactory and expeditious

person except through the superintendent or foreman, and all instructions originating in the board should go through the engineer. This principle should be rigidly followed; to do otherwise destroys the prestige of the superintendent with the men, and undermines his power to preserve discipline and to secure the best work. Every man should know that he owes his employment to the superintendent and that no amount of "pull" can save him from discharge by the superintendent.

That the supervision of road work on any system—township, county or state, should be centralized is a principle that has been found of value wherever the best roads are being built. In France, Germany, England and the American states, where road building is making the most headway, the centralizing of responsibility is recognized as a vital necessity. In this way expert knowledge is directed to the design of roads, and the forces available are directed by business-like methods adapted to the best forms of construction.

I do not, of course, mean by this to take the general control of the work out of the hands of the county board or those in legally authorized contract, nor do I mean to delegate any improper function to the engineer. No engineer would wish this. For instance it is proper for the county board to designate the point from which any road is to be built and the point to which it is to be built. It is then the duty of the engineer, without, any interference, to make all the locations and to decide all location questions between these points. And less authority than this would make the position of the engineer ridiculous and his employment by the county of little value.

Careful consideration of county laws before their passage; careful selection of the county board; and careful selection and organization of the personal and other requisites of the construction force will make largely for the success of the county work.

A Split Log Drag Club.

A Split Log Drag Club is one of the latest organized movements for road building in Texas.

The territory covered by a Club usually embraces about six miles of road and the farmers along the route join the Club and they pay fifty cents membership dues per month. All the money received by the Club is used in defraying the expenses of running a Split Log Drag over the road when needed.

The County Commissioners of Cooke county furnish free of charge to each Club, a Split Log Drag of steel construction, which cost \$25.00 to build and the Club stands the expense of operation. Cooke county now has eleven of these Clubs in operation and the results are so satisfactory that the movement is rapidly spreading throughout the entire county.

The business men of Gainesville assist in the organizations. It is quite a common occurrence for fifteen or twenty merchants and bankers to ride ten or fifteen miles in the country to attend a Split Log Drag meeting and they usually join the Club, lending their moral and financial support to the movement.

The Red River to the Gulf highway now being laid out by R. J. Potts of the Texas A. & M. College is exciting statewide interest and an effort is being made by the commercial clubs in the Panhandle to run a loop from the Fort Worth branch through the Plains country. The Bowie Chamber of Commerce is working out a route through Montague county to Wichita Falls and the Commercial Secretaries will ask the path finding party to blaze a route that will encircle the cap rock and return to Fort Worth through the Stanford

country. A route can be selected that will require very little road construction as natural roadways exist through most of the Plains country and the scenic grandeur will be attractive to tourists.

Mr. Clifford M. Hathaway, Jun. Am. Soc. C. E., has resigned from his position with the Rhode Island State Board of Public Roads to accept a position as assistant engineer with A. H. Blanchard, Consulting Highway Engineer, Providence, R. I.

Mr. Henry B. Browne, Assoc. M. Am. Soc. C. E., has resigned as instructor in Civil Engineering at Brown University to accept an appointment as instructor in Highway Engineering at Columbia University, New York.

With nearly 15,000 miles of transcontinental, interstate and trunk line highways contemplated in various sections of the country, if all plans are carried out it soon will be possible to drive from the Atlantic to the Pacific coast, from British Columbia to Mexico and from Canada to Florida. The United States office of public roads has just prepared a chart of improved roads contemplated or under construction, showing a great network covering the whole country.

A good road is a lasting monument to the genius and progressiveness of a nation. Imperial Rome fell centuries ago and her temples have crumbled into dust. Only her good roads survive.

Just as long as you never call upon an assistant to do work that you would not do yourself, you will not be imposing upon him.

It is one thing to be honest—entirely another to be intelligently honest.

W. S. FALLS, WILSON, N. C.

Civil and Highway Engineer

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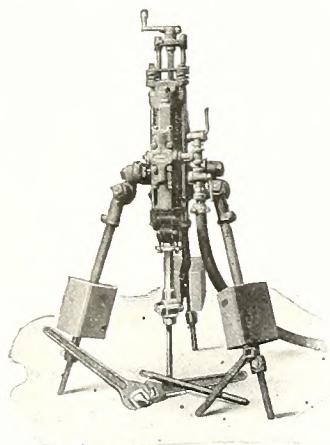
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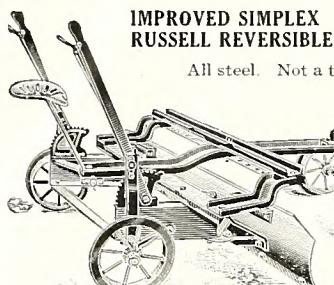


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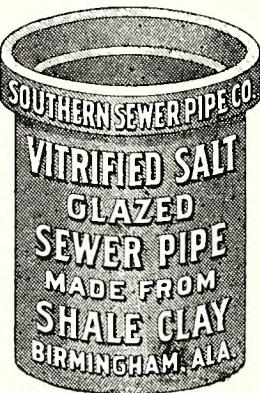
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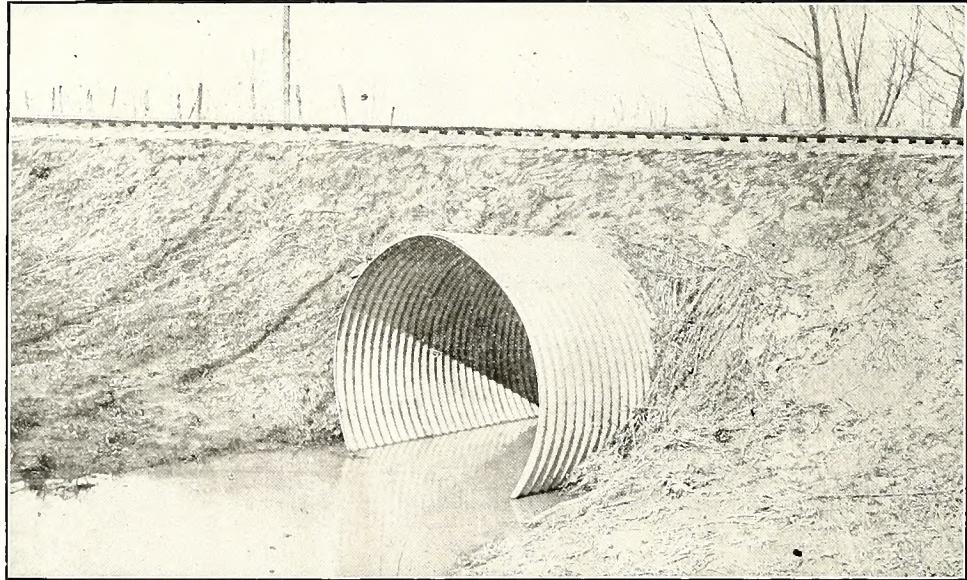
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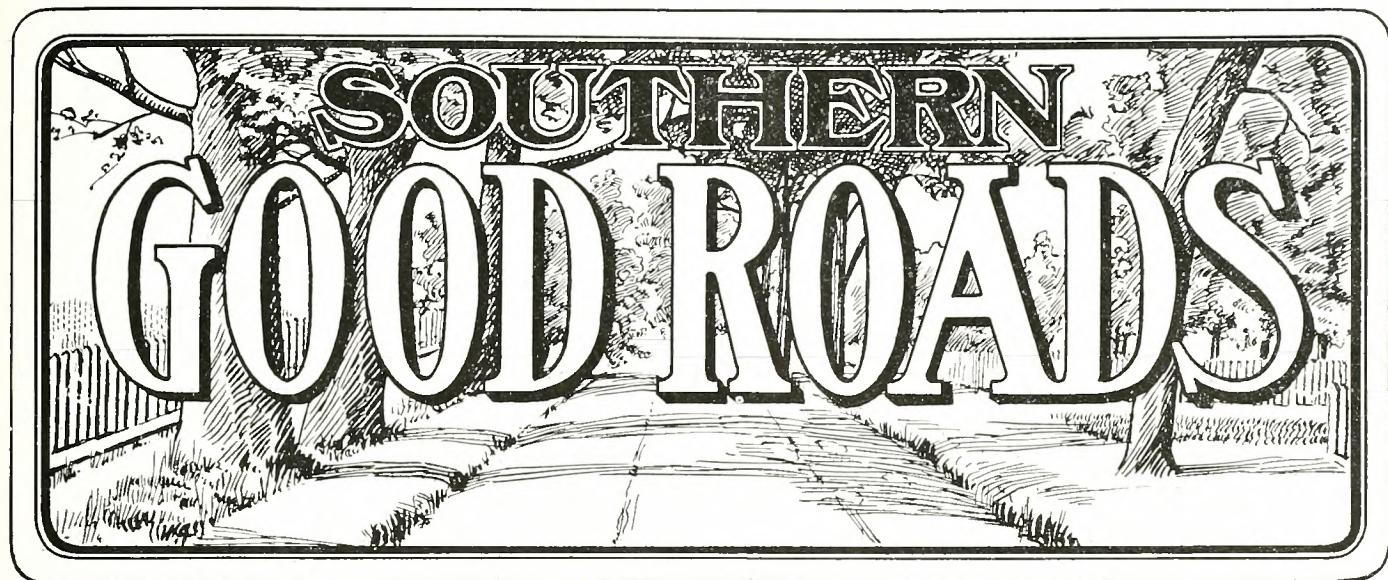
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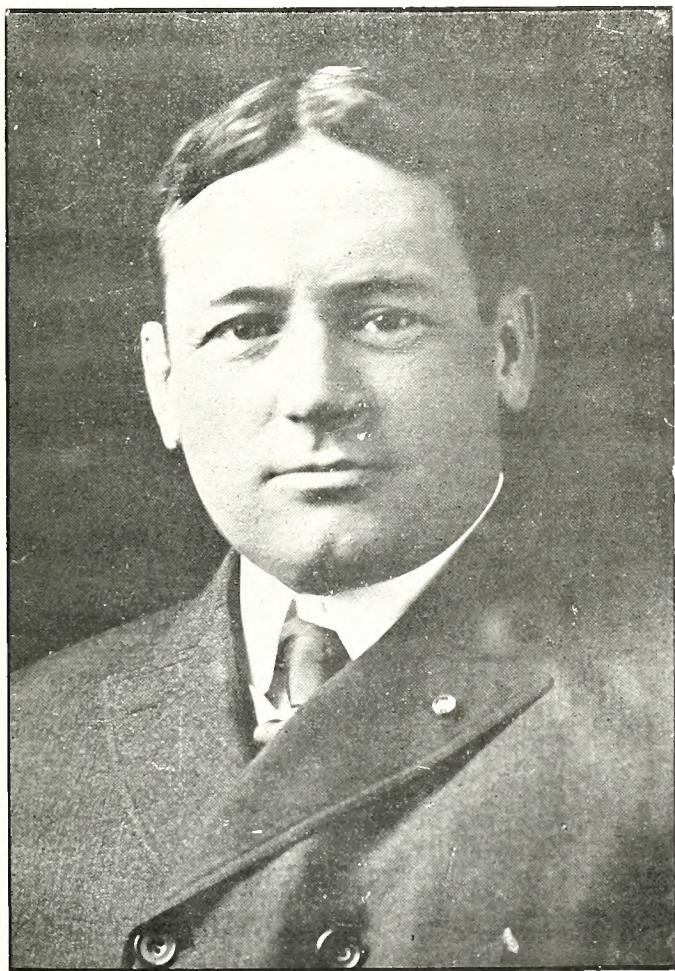
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“Telford Roads”

By MAJ. W. W. CROSBY, State Road Commission, Baltimore, Maryland



MAJ. W. W. CROSBY

The history of road-making extends over a period of 2500 years. The Romans learned the art of making paved roads from the Carthaginians and the Roman roads have always been regarded as models from which to copy and plan for present day work. The Incas in Peru built extensive roads according to Humboldt, "not inferior to the most imposing Roman roadways." The early French roads were constructed on the Roman method until about the beginning of the eighteenth century, but after about 1764 the methods were considerably modified by M. Tresagnet and later, after M'Adam had achieved so much success in the British Isles still further modifications were adopted in 1820.

Perhaps one of the most striking features of the older methods was the attention given to and the expense incurred in providing the most solid foundations. These were frequently three feet in thickness, composed of several layers of large stone. The early French methods simply reduced the thickness to about one-half that of the Roman foundations and later Tresagnet reduced the foundation to one layer of large stone eight to twelve inches high set on edge—a forerunner of what is now called "Telford."

In August 1757 Thomas Telford was born in the district of Eskdale, county of Dumfries, Scotland. Learning the trade of a mason he studied architecture in Edinburgh and London and being a man of great ability, soon established himself as a leading engineer.

Primarily Telford was a bridge builder, but he carried out many other engineering works, particularly that of laying out and constructing new roads. He was extremely successful in building nearly one thousand miles of roads in Scotland by contract. He let 120 contracts for this work, extending over a period of 18 years and the work was done with an economy before unheard of and which resulted in extending his fame widely and to his being called as consulting en-

gineer on various engineering projects in Europe.

One year previous to the birth of Telford, was born another famous roadmaker, John London M'Adam, at Ayr, Scotland. M'Adam spent his youth in the United States of America, returning to Scotland in 1783. The rest of his active life was passed in road work in Ayrshire, Falmouth, Bristol, Perthshire, etc. His success was such that he is generally considered a pioneer of good road construction and administration and entitled to the reputation of a public benefactor.

It will be noted that Telford and M'Adam were contemporaries. The reputation of each will long survive their work, and justly so. In many ways they worked along identical lines. To-day we separate or identify them by one difference in particular, that is in the matter of the foundations preferred by each for the road surfacing itself.

M'Adam preferred to consolidate the natural soil by drainage, by reinforcing it with gravel or by similar stone directly on the prepared sub-grade, increasing the thickness of this layer of stone as might be necessary over weaker sub-grades. Telford preferred to follow the older method and provide between the natural soil and the surfacing coat, a pavement of large stone for the support of the surface.

Since the passing away of the man whose name is now attached to it, this sub-pavement has been repeatedly tried by nearly every community proceeding with the work of road improvement, in the early stages of its work, and abandoned later in nearly all of them.

Undoubtedly such a foundation accomplishes its aim—to provide sufficient solidity for the surface. But, expedient as it may have been under the peculiar conditions of its use by Telford, it is questionable if its use did not at the same time produce other conditions

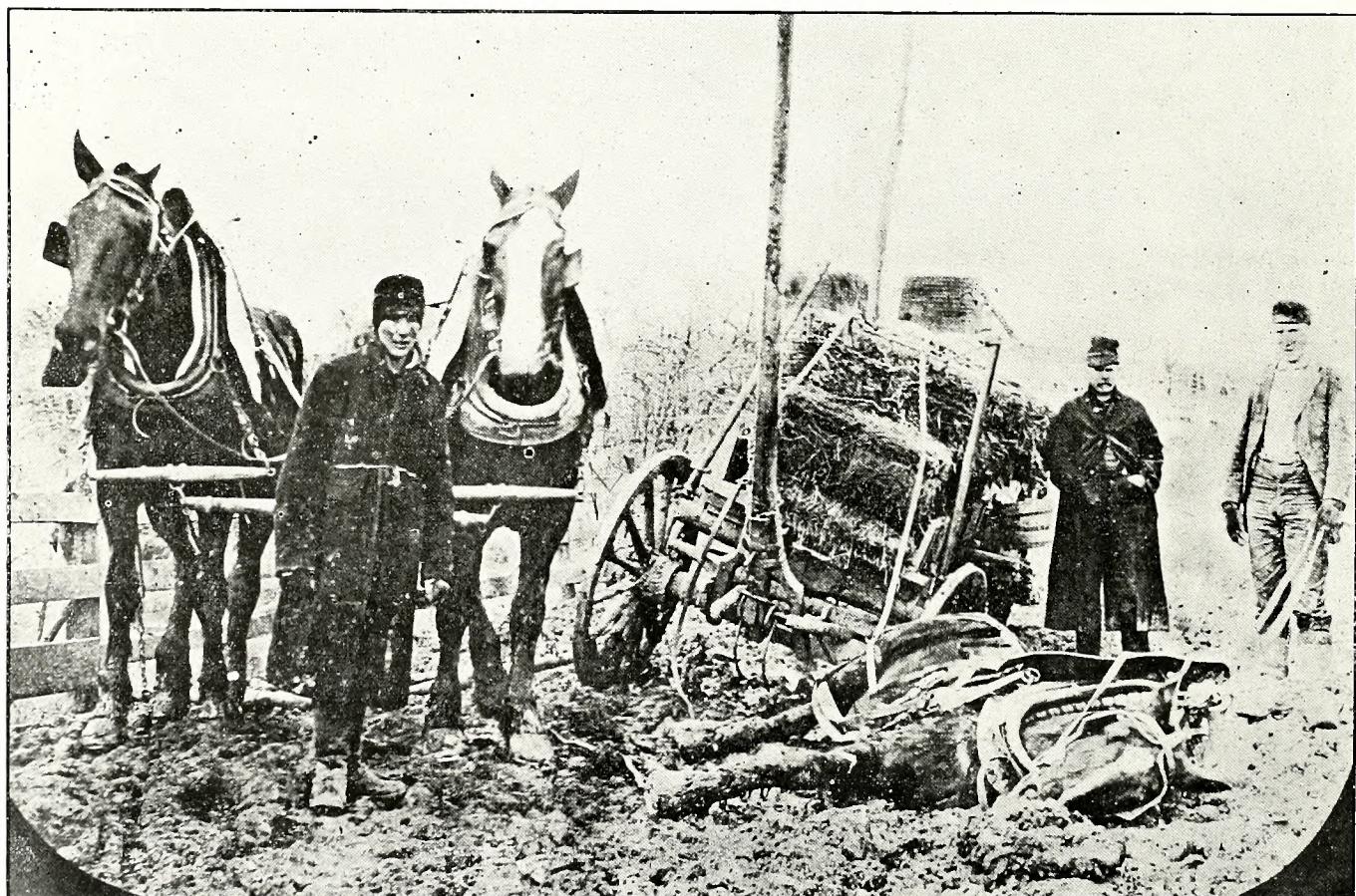
which ultimately might furnish arguments against it. It is of course probable that conditions where Telford worked were such that his well known aim of economy was met with the use of the pavement foundation. Conditions have, however, so changed since his time that it is perhaps doubtful if Telford himself would now repeat its use, at least to its former extent, in the same localities and it is most probable that under the changed conditions now existing here with us that he would abandon, to a large extent, at least if not wholly, its general use.

When the older roadbuilders were securing their results, labor was cheap, material plentiful and in many cases expenses of comparatively little moment. Coarse stones for the foundations were less hard to secure than the broken stone for surfacing. The latter were slowly broken by hand. Steam rollers were unknown. Records of first cost were not clear in many cases and no records of maintenance cost, for comparison with a census of the traffic over the finished work, were available for pointing out what was economical construction and what was not.

Further it is doubtful if a fair comparison of results of the method in use by the Romans, and followed by Telford, can be made with similar work elsewhere because of a lack of knowledge of, or lack of record of, the variance in the local conditions of climate and use. We do know, however, that "Telford" was tried in France and abandoned for "Macadam."

In this country, with its diversified conditions, both Telford and macadam have been used under all sorts of circumstances and the consensus of opinion seems to be against the use of "Telford" except under most extraordinary circumstances.

Nowadays, with the rise in valuation of even rough



Bad Road in West Virginia. Wagon in Mud—Dead Horse. Is This Civilization or Semi-Barbarism



Gravel Road in Dinwiddie County, Virginia

stone; with the increase cost of labor; with the advent of the steam roller and the modern stone crushing machinery; with the changed conditions of vehicular traffic; and especially in many parts of this country, with the existing variety of climatic conditions, such for instance as long continued rainy weather, long periods of drought, deep freezing, or alternate freezing and thawing, the best practice seems to unite in the abandonment of "Telford" foundations.

Numerous trials of it have been made in different localities and even to-day one occasionally hears of some state, just starting, in on modern road work, which adopts in the early days of the work the "Telford" road as its standard. Later, it will be generally found that the inelasticity of this adoption has resulted in a reversal of policy.

In the effort of the inexperienced to improve on previous results, by building apparently more substantially, is lost sight of the fact that rigidity and high first cost may not always be most advantageous and the fact that frequently permanence may require to be sacrificed to some extent for the sake of economy or of comfort and convenience.

A "Telford" base will certainly give rigidity and resistance to vertical displacement under occasional heavy loads. It is open to the objection, of, however, being frequently too rigid and unyielding for the economical maintenance of the surfacing on top of it. Such a base acts as an anvil upon which the pieces of stone in the surfacing may be more easily reduced to a powder by the hammering effect of the heavily loaded wagon tires.

Where frost penetrates the ground to the depth of a foot or more it has been proved by general experience that the large stone composing the base will work up into and destroy the surfacing, as well as thus losing their own lateral support, under such frost action and

consequently much of their power to support loads. When the base becomes so displaced the maintenance of the surface is rendered still more difficult and expensive.

In many instances, the maintenance of a bond between the broken stone surface coat and the paved base has been found extremely difficult under the peculiar conditions of the local traffic.

There are moreover, a very few occasions, if any, where the necessary firmness for the base to the macadam surface cannot be secured by other methods, both freer of objections and less expensive, than by the Telford base.

There may be instances where Telford would be demanded by conditions but in all the experience of the writer he can recall no case where the demands could not have been better met by some other form of construction and he is familiar with instances where it has been found with unsatisfactory results.

It should not be understood from the foregoing that Telford invariably required the pavement now bearing his name, under the surfacing. As a matter of fact he did not and in No. 5 of his famous "General Rules for Repairing Roads," he says, "Where a road has no solid and dry foundation it must be constructed anew. It must be well drained and put into a proper form. Upon the 18 centre feet of the roadway, stones must be put ("Set by hand") forming a layer of 7 inches deep. Soft stones will answer or cinders, particularly where sand is prevalent. Where a road has some foundation, but an imperfect one, or it is hollow in the middle all the large stones appearing in the surface of it must be raised and broken; the 18 centre feet of it must then be covered with a coating of broken stone, sufficient to give it a proper shape, and to form a bed of solid materials of at least 13 inches in depth.

"Where a road already has a good foundation and also a good shape, no materials should be laid upon it but in their layers, for the purpose of filling ruts and hollow places as soon as they appear. Stones broken small, as above described, being angular, will fasten together. In this way a road when once well made may be preserved in constant repair at a small expense."

However the generally accepted distinction between the work of M'Adam and Telford is the absence or presence of the paved base and such roads as have this base are invariably called "Telford Roads," and the

base itself is referred to as "Telford," just as the broken stone surface is called "Maeadam."

While Telford the engineer is now perhaps best known by the pavement he advocated under some circumstances as a base for the broken stone surface, his fame as an engineer will remain long after the use of the pavement for that purpose shall have been everywhere abandoned, and the sound common sense of the man Telford as well as that of his contemporary M'Adam will always be honored by English roadmakers as is that of Tresaguet by the French.

Value of Improved Highways

The essay contest among members of the graduating classes of the Lancaster county, Pa., high schools, who wrote on "The Value of Improved Highways" as the subject of their commencement essays, was won by Miss Mary Homsher, who was awarded the first prize of fifteen dollars given by the Lancaster Automobile Club. That a girl entered and won the contest is an



MISS MARY E. HOMSHER, of Strasburg, Pa.

indication of the interest manifested in road affairs in Lancaster county. State Highway Commissioner M. J. Brecht, Dr. A. E. Leaman, president of the Lancaster County Supervisors' Association, and C. W. Cummings, Street Commissioner of Lancaster, acted as the judges who passed upon the essays submitted. Miss Mary Homsher, of Strasburg, captured first prize.

Miss Homsher's prize essay is as follows:

In the onward march of civilization there has been no factor of greater importance than that of transportation or the getting of the people from one place to another. The people of isolated places from whatever cause, and whether those places have been nations, States, counties, townships, or small communities, have always brought up the rear in the advance of progress in everything that pertains to the necessities, comforts, culture, wealth and luxuries of life. The great historian, Macaulay, says: "Of all inventions, the alphabet and printing press alone excepted, those inventions which abridge distance have done most for the civilization of our species. Every improvement of the means of locomotion benefits mankind morally and intellectually as well as materially."

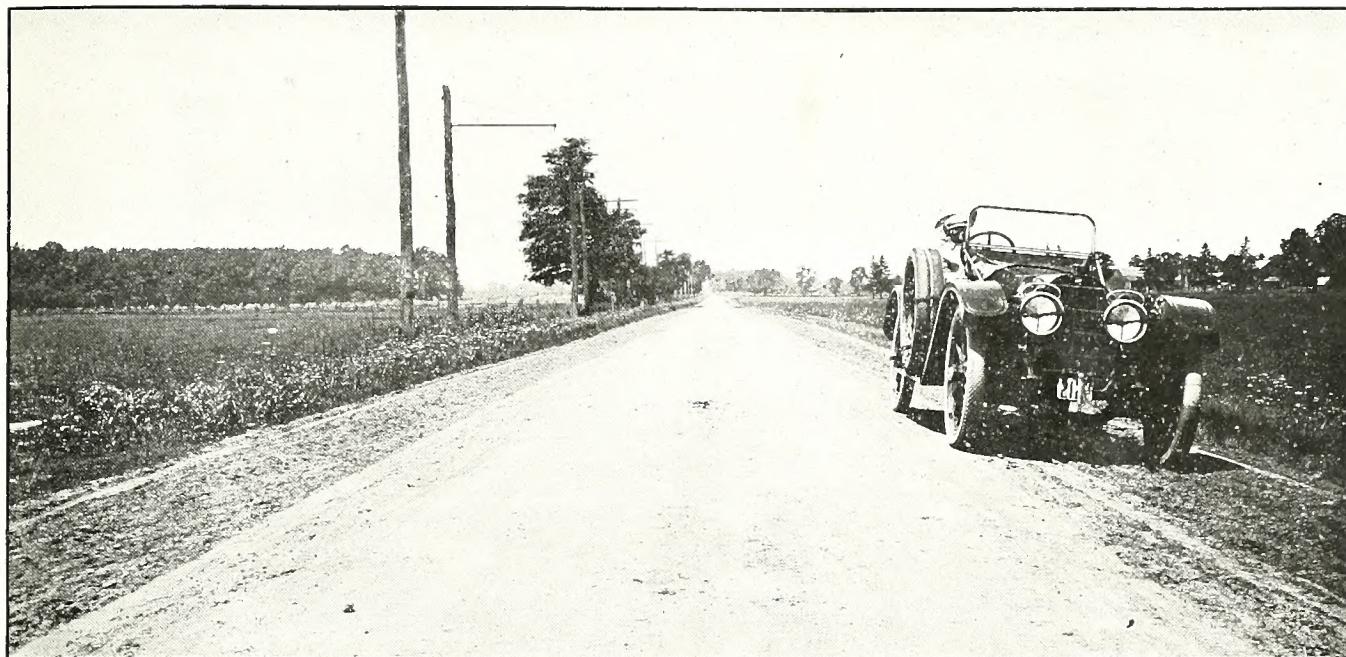
The principle applies alike to all manner of highways and means of transportation. The oceans and rivers are the natural highways, and until the discovery of the powers of steam, most of the civilization of the world was confined to those places where the shores of the seas offered a safe haven for ships and along the banks of the streams. Until railroads were made, places far inland, however fertile or rich in natural products, were of little value, but wherever these have extended the wilderness flees ahead and prosperity abides in its place.

The trolley roads radiating through the country scatter diamonds of value in the comforts and conveniences of living and in the enhancement of values. No turnpike or maeadam road was ever built but that added increased conveniences and wealth to the adjacent territory, and no bridge was ever erected or common road improved but did the same.

It is true there was a civilization before the great inventions that have made the present speedy transportation possible, but it was mean compared with the enlightenment of today, and even such as it was, it was always relative to and dependent upon and in proportion to the facilities for transportation the times afforded.

It is the nature of mankind to be progressive and advance if given a chance but it has never been able to improve far beyond the environment of its highways. As these have been extended barbarity, indolence, poverty, superstition and ignorance have in order receded, to make place for industry, intelligence, comfort, culture, elegance and wealth.

In the evolution from poverty and privations to comfort and competence the transition is step by step. When the settlers first came to this country peopled with barbarous and half starved savages they were glad for a cave or a hut in the woods and for the commonest necessities. Life was full of hardships and



Macadam Road Near Trenton, N. J., on the Montreal-Miami Highway. This Road is Fourteen Years Old

drudgery of labor to get a bare existence. This is the history of all who have trod in the van of civilization. Prosperity followed in the wake of industry. The houses were soon made larger and many comforts added. Commerce, made possible by transportation to the seaports and rivers enabled them to have a variety of food, and the homestead became a place of comfort. Culture and elegance followed until now the homes standing on the sites of the huts of the settlers are places of comfort, convenience, luxury and refinement far beyond anything ever dreamed of by the ancient prince, baron or nabob of history, fable, song or story.

Such progress would be impossible without commerce for the exchange of commodities and for interchange of thought and ideas which inculcate culture, and both of these requisites of commerce and the interchange of thought and ideas are impossible without the means of highways.

What is true of highways in relation to nations and States is true of them in relation to the smaller communities, counties and townships. Wherever the means of transportation are best the people are the most prosperous and the values are highest. The evolution is the same as with the homes. First a mere track through the wilderness. Then out of necessity the road. Where the travel is great, the turnpike or macadam road follows and they in turn, in the cities and suburbs give place to roads of brick or asphalt.

This country having now advanced beyond the condition of bare necessity, the people have started upon a widespread movement in the second phase of the evolution of good roads, that of comfort and ease of travel. The improved conditions will enable commodities to be cheaply and quickly transported and the increased ease and speed will bring an increased intercourse with people, both as a matter of business and recreation. The good roads will operate as a check against exorbitant charges for transportation, both of persons and goods. Some time ago a large gasoline delivery wagon brought a moving, furniture, family and all, from Camden, N. J., to Lancaster, over sixty miles, in a few hours. There can be no exorbitant charges for transportation with such facilities in competition.

And the third phase of the development, that of elegance, will go hand in hand with the second one of comfort and ease of travel or will follow soon after. Already along the roads that have been improved at many places stately gateway pillars of stone or concrete mark the entrances to fine driveways and artistic steps and handsome walks of concrete lead to the dwellings. Picturesque bridges, also of stone or concrete, make permanent causeways over rivulets and streams and add beauty to the landscape. As the work progresses, all straight lines along the roadsides will be made perfectly true and all bends in the lines will be made perfect curves. The banks by the sides of the roads will be evenly sloped and terraced and the trees and shrubbery well pruned.

These improvements will distinguish a progressive and prosperous community from a backward one. In addition to the comforts, convenience and elegance of the communities foremost in these improvements, wealth will increase from the increased facilities for transportation and by the enhancement of values in property.

The value of all kinds of property is in a large degree a matter of sentiment. Two horses may both be good, alike for work or driving, but the fine handsome one is worth two or three times as much in money value as the ungainly one that may be its equal or superior for use. Fine fruit and produce of all kinds commands the highest prices, and the farms and homes in progressive communities are no exception to this rule.

It lays with the people of every community to provide these improvements for themselves. To obtain them the people of each community must not hinder, but encourage every proper means for progress in their development. Money intelligently spent for betterment of the highways is a gilt-edged investment for all the people of a community. Every new road laid out where it will add convenience to any part of a section, every bridge and culvert erected or improved, every hill graded, every road widened or straightened, every breaker removed, adds value to the whole country about. The desirability and value of a community is made up for all the advantages, conveniences, improve-

ments and wealth of the different parts comprising it, and every possibility for betterment left neglected or undone is a resource undeveloped for the community. The improvement of the highways is the golden key

that will unlock to the people all of the good things that make life happy and pleasant; competence, comfort, convenience, culture, wealth and elegance.

Earth Roads--Construction and Maintenance

By MAJ. ROBERT GIBBES THOMAS, Professor of Mathematics and Engineering, The Citadel, the Military College of South Carolina

The desirability of good roads needs in this day no extended advocacy. Their desirability, if not their necessity, is generally acknowledged. The agitation of the subject during recent years has called forth from various sources full and convincing expositions of the advantages of good roads to the citizen, to the state, and to the nation.

I shall, therefore, proceed at once to my immediate subject, Earth Roads—Construction and Maintenance.

In regard to good roads, as to most good things, there are obviously degrees of excellence.

While the best may be beyond our means of attainment, surely it is the part of wisdom to improve conditions where practicable, to get better roads, when the cost of the best is prohibitive.

While it is to be hoped that the roads, over which there is heavy traffic in the vicinity of the cities and towns of the state, will be macadamized, graveled, or

munity well until the increase of traffic makes a more unyielding surface imperatively necessary.

It is to be remembered that when the time comes to build a macadam or other pavement, it will have to be built upon an earth bed, so much of the work of making an earth road may be utilized in the future, when it becomes necessary and practicable to have a paved surface to the road. The condition of the common roads is so bad at certain times that it is desirable that every interested citizen should know something about the location, construction, drainage, and maintenance of earth roads—and under the term, earth roads, are included those with an admixture of sand and clay.

Everything connected with the construction, use and maintenance of roads was, in times past before the introduction of railways, the subject of exact observations and experiments, many and varied in character. On this account old engineering works that treat of road-making are excellent reading today. This is true not only of the construction but of the need of better legislation.

It is held that many of the evils as to bad common roads that we suffer from at the present time are inherited from the antiquated legislation of the past.

Now that we have the results of a great number of years of experience in older countries, it seems that there is little to invent but much to learn in this branch of construction.

Yet there have been improvements in roadmaking and especially in road-making machinery and tools—notably the stone crusher and the steam roller.

It must be acknowledged that conditions in this country are in many respects different from those that obtain in the older and more thickly settled countries of the old world. Nevertheless the fundamental principles of good road construction are the same everywhere, and once they are understood, can hardly be forgotten.

The most economical location of a road is that for which the sum of the cost of transportation, the cost for maintenance, and the interest on the cost of construction is a minimum. The cost of transportation is affected by the rate of grade, the rise and fall, and the length. The rate of grade is important, because it limits the loads that can be hauled or determines the number of loads, and it fixes a limit to the speed of travel. The rise and fall affects the expenditure of power to haul a load over the road. The length of the road has an effect upon the amount of work of hauling, the time required for a trip, and the cost of maintenance. The cost of construction depends upon the accuracy with which the line of road is fitted to the surface of the ground, as determining the amount of earth work and cost of bridges and culverts, and, upon the character of the ground over which the road is to be built, as that affects the cost of the work and the expense of drainage.

In location the grade of the road is the most important direct line between two places, the grade is often made much steeper than there is any necessity for. The



MAJ. R. G. THOMAS, Charleston, S. C.

otherwise improved in the not distant future it is evident that in the main the public roads of the state must of necessity be composed of earth for many years to come. Such being the case, it is fortunate that under favorable conditions, when well drained and free from ruts, the earth road is the most satisfactory for pleasure and for light traffic.

The statement that an earth road is as good as any other kind of road, if kept well drained and free from ruts, reminds one writer of an old saying that a certain bronze eagle in Salt Lake City "flies down to get a drink every time it hears the town clock strike." The writer holds that the statements are true in both cases, but the conditions are equally impossible of fulfillment. No, the claim is not made that under all conditions the earth road is as good as any other type of road. It is held that with proper construction and maintenance the earth road is a good road, and it may serve a com-

fact is overlooked that the distance half-way around a hill or valley may be little, if any, longer than the distance over the hill or through the valley. The aim in location should be to make the road the easiest and most economical and the shortening of the roads should be subordinated to these considerations. The difference in length between a straight road and one that is slightly curved is less than many suppose. It has been shown that if a road between two points 10 miles apart were made to curve so that the eye could see no farther than a quarter of a mile of it at once, its length would exceed that of a perfectly straight road between the same points by only 150 yards. The value of straightness for a country road is frequently very much overrated. Considerable deviations from the straight line may often be made with but slight increase in length. While straight roads are the best for traffic, often things being equal, in hilly country straightness should be sacrificed to lower the grade; and for pleasure the curved road gives a greater variety of scenery.

Many roads have been made on such steep grades that the cost of cutting and filling to bring them to a proper grade would be greater than to relocate and make the roads anew.

Distinct from and independent of the rate of grade is the amount of rise and fall on the vertical height through which a load must be lifted in passing in each direction over the road. The minimum amount of rise and fall is found where the rise is all in one direction and the fall in the other, each being equal to the difference of elevation of the terminal points. Any increase in the rise and fall beyond this amount is represented by the rise encountered in passing from the higher to the lower terminus. It affects the traffic equally in each direction, and requires a certain expenditure of power to lift the load through the given rise in each direction. The rise and fall may be evaluated in terms of distance. Thus an ordinary earth road whose resistance to traction where level is 100 lbs. per ton, the distance a ton may be moved on the

level surface in developing 2000 foot-pounds of work is 2000 divided by 100, and equals 20 feet.

As the work of lifting one ton through a rise of 1 foot is 2000 foot-pounds, 1 foot of rise or fall may be considered as equivalent to 20 feet of level distance. So far as expenditure of power is concerned, the elimination of unnecessary rise and fall is thus equivalent to shortening distance. Of course when the termini of the road are at different elevations there is a certain amount of rise and fall that must necessarily be encountered. The proper grade for any particular road must be determined by the conditions and requirements existing on that road.

The ideal is the level road with no rise or fall, but as the level road can seldom be obtained in rolling country, it is well to consider the greatest allowable grades for country roads.

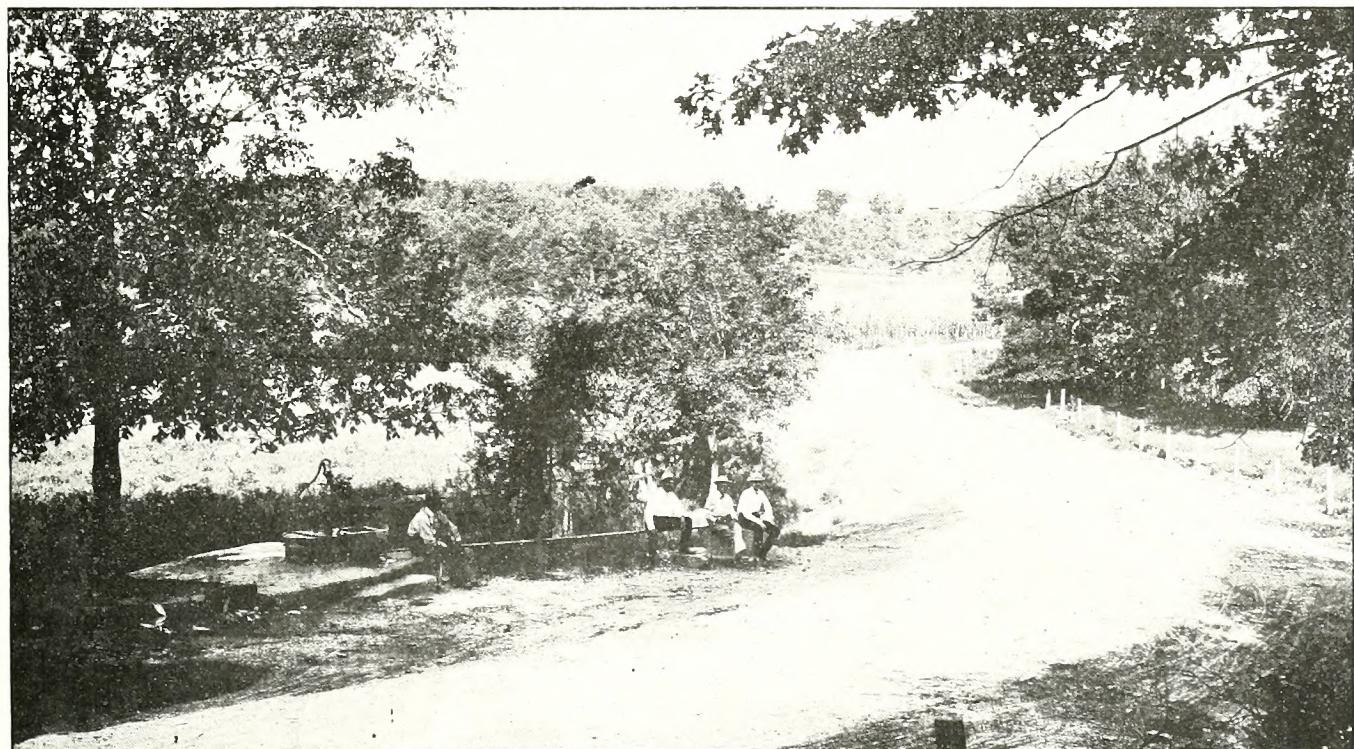
It has been found that for a short time a horse can double his usual exertion, and that he can draw only about one half as much on a 4 per cent. grade as he can on a level road.

If full loads are to be hauled, this would make a 4 per cent. grade the maximum.

One authority states from his own observation and from tests made by the U. S. Agricultural Department, that a team can exert four times as much tractive energy going up a short hill as its average pull upon the level. As the load that can be hauled continuously up a 10 per cent. grade has been found to be one fourth of that drawn upon the level, this shows that the full load might be carried over a ten per cent. grade for a short distance—say 200 feet.

Most road builders prefer 3 per cent. grade to those of 4 per cent. where they can be secured without additional expense. A 3 per cent. grade is one down which a horse with vehicle can comfortably trot.

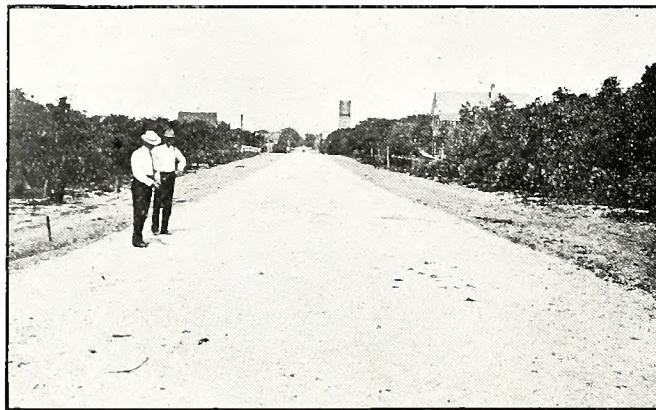
On all public highways which are travelled by heavily loaded vehicles, the aim should be to keep the grade down to 3 or 4 per cent. and not to exceed 5 per cent. In mountainous regions steeper grades are often



Chert Object Lesson Road, Fort Smith, Arkansas

unavoidable, and even in ordinary hilly country it is good engineering not to reduce grades where much earth work is necessary, as it is generally a few short deep cuts that add so greatly to the cost of a road.

In most parts of the state the roads are in the main already located and the problem of location consists for the most part in the relocation of portions of old roads, so as to reduce the grades and render the roads more convenient and pleasant for the use of travel.



Shell Road Boulevard to the Beach, Fernandina, Fla.

When the road must be constructed out of the material over which it passes, it is often possible to select a route where the soil is better adapted for the purpose than that found where first located. Upon one side of a valley the surface may be clay, upon the opposite side gravel, and in the bottom of the valley the soil is usually alluvial—higher up the ground is generally far more fit for road purposes.

In starting the construction of any road the width and shape of the cross section has necessarily to be determined. The practice is too common of designing a uniform cross section for a road regardless of the character of the soil and the drainage area that the ditches must serve. A uniform cross section for all parts of the road should not be adopted.

The depth of the ditches should be made to vary with the character of the soil—very shallow in sand and on steep grades and deep in flat soggy land, but ordinarily not much more than a foot below the general ground level. The width of the road will depend upon the requirements of the case—sometimes 12 feet is sufficient, but 18, 24 and 40 feet are the usual widths for country roads. The surface should be formed with a crown at the middle sufficient to shed the water that falls upon it and prevent it from standing upon the road surface. The slope necessary to shed the water readily is about 1 in 20—a fall of 5 per cent. each side from the middle. The most desirable section is usually that composed of two planes of equal inclination rounded off in the middle. Such a surface can be constructed and repaired with the road machine and a roller can be used to advantage. Deep, narrow bottomed ditches at the sides are to be avoided. Wide, shallow ditches are best generally and they are favorable to the use of drag and wheel scrapers—the wheel scraper being regarded by one authority as the greatest labor saving device for moving earth ever invented. Sometimes the only ditches necessary to carry off the surface water are those made with the road machine. The side ditches should have a fall of at least half a foot in every 100 feet—in fact the road itself would be better to have that slope longitudinally

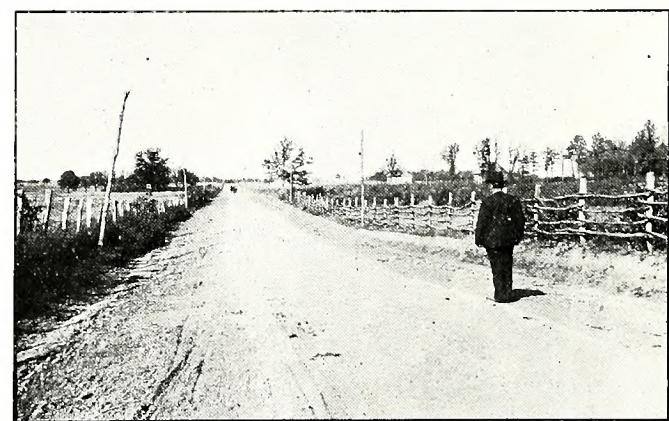
than to be level, so as to secure drainage of any incipient ruts that may form in the road surface. As noted before, the problem immediately before the people of this state is generally the improvement of existing roads, and enough progress in this direction has been made in recent years to show how much improvement can be effected.

The improvement in the surface of the earth road has been most marked. The method of improvement of the surface depends upon the nature of the material of which it may be composed. When the material is loose sand, the surface will be more firm if the sand be damp and more unstable in dry weather. In such cases a small admixture of clay in the surface layer may give cohesion to the surface when dry, or a layer of clay six or eight inches deep may form a hard and comparatively durable surface, as it is easily drained when upon a sand road bed.

Clay used alone is the least desirable of all road materials, but roads composed of clay may be treated with sand or small gravel, from which quite a hard compact mass is formed, which is nearly impervious to water and but little acted on by it. Material of this character found in the natural state, known as "hard pan" or "cement gravel," makes, when properly applied, a very solid and durable road. In soil composed of a mixture of sand, gravel, and clay, all that is necessary to make a good road is to crown the surface, keep the ruts and holes filled and the ditches open and free.

Drainage is especially important upon earth roads, as the material of the surface is more susceptible to the action of water and more easily destroyed by it than are the materials in the better class of roads.

It has been said that the whole problem of the improvement and maintenance of ordinary country roads is one of drainage. Drainage, more drainage, better drainage, should be the cry. Surface drainage is mainly effected by making the surface of the road slope from the middle to the side ditches. When the road is



Macadam Object Lesson Road Built in 1904 By United States Office Public Roads, Near Lebanon, Mo.

on a steep grade the inclination of the slope to the sides should be greater than when on a level, so as to prevent the water from following the wheel tracks.

The side ditches can be prevented from being washed into deep gullies by paving the bottom and sides with brick or field stones. When water has to be carried under the road, sewer pipe or culverts of concrete, stone, or brick will be in the long run more economical than those of wood. In very wet ground sometimes

under-drainage must be resorted to in order to get a dry road bed. The maintenance of a country road in good condition requires constant care and watchfulness. Any small breaks in the surface should be immediately repaired, and ruts filled and smoothed before they become serious. Earth roads are especially difficult and expensive to maintain under the common system of repairing once or twice a year or at long intervals.

The only way to keep an earth road in good condition is by the employment of men whose business it shall be continually to watch the road and make such small repairs as may be necessary from time to time. Ruts and holes should not be filled with stones unless a considerable section is to be so treated. They should be tamped full of some good material like that of which the road is constructed. When work is needed over a considerable area, earth roads can be rapidly repaired by the use of road machines and road rollers. In case the roadway is sufficiently high, the work should begin in the middle of the road and the loose dirt should be gradually pushed to the ditches and finally shoved off the roadway or placed where it will not be washed back into the ditches by rain. The advantage of this method is that a smooth, firm surface is at once secured—a surface which will stand wear much longer than one composed of loose worn out material thrown up from the ditches. When, however, the crown is worn down and the roadway low, it is desirable to work from the sides, scraping the material lightly toward the middle until the proper crown is obtained, and then the surface compacted by the roller. It is claimed that two good men with two teams can build or repair more road in one day with a roller and road machine than many times that number can with picks, shovels, scoops, and plows, and do it more uniformly and more thoroughly.

As soon as possible after long continued rains, the roads should be gone over with the scraper and put in proper form, and then rolled down hard.

While earth roads should be generally repaired in the spring and fall of the year, if they receive daily attention, they will require no extensive repairs. The old adage, "a stitch in time saves nine," finds application here.

A system of common road maintenance, introduced in Vermont, has been so successful in operation that "much better roads are secured at less expense and the tax rate for highways has been reduced each year."

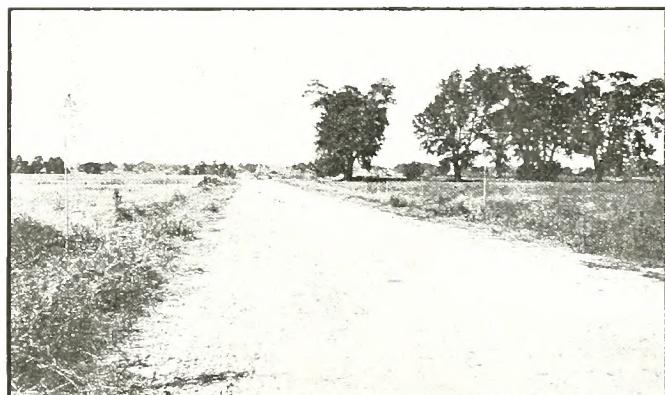
This system is like that applied to railway maintenance—the roads are divided into certain lengths and each length allotted to a section man, care-taker, or farmer. It is suggested that our important country roads could be divided into sections varying in length from one to five miles, and a good road man who lives on the section put in charge. It should be his duty to devote a few hours each week to the filling of small ruts or holes and to the protecting of the road from running water. He would have plenty of work to do in keeping the road clean, free from loose stones and rubbish—in cutting weeds and clearing drains and side ditches. The efficiency and economy of this plan of maintenance have made the roads of France and other European countries deservedly famous.

In the preparation of this paper the writer acknowledges his indebtedness to the following named authorities: Spalding on Roads and Pavements, Herchel on Science of Road-Making, Gillette on Economics of Road Construction, and Bulletin of the U. S. Agricultural Department on Earth Roads.

Great Good Roads Tour to Richmond in November.

Mr. Leonard Tufts, of Pinehurst, president of the Capital Highway Association, is taking a great deal of interest in the coming gathering of the good roads hosts of the nation at Richmond, Va., November 20-24, when the American Association for Highway Improvement is to hold its annual meeting. In a letter to Mr. H. B. Varner, president of the Central Highway Association, he suggests that the Central Highway Association join the Capital Highway Association at Raleigh or Durham, in a great good roads tour to Richmond for the meeting. In a letter to the members of the Capital Highway Association, and to others interested in good roads, a copy of which was enclosed, Mr. Tufts had the following concerning the tour:

"It is the earnest desire of the officers of the Capital Highway Association that you attend the meetings of the American Association of Highway Improvement, and the Capital Highway Association will hold a meeting at Richmond during this convention. It is our hope that at least one hundred cars will join in a tour over the Capital Highway and meet the tourists from the North at Richmond. It is our intention to start this tour from Atlanta and to interest the people of Savannah to join us at Augusta. The cars will leave on the morning of November 13th, those from Augusta and Aiken on the 14th, Columbia and Camden on the 15th, Jackson Springs, Pinehurst and Southern Pines



Gravel Road, Savannah, Ga.

on the 16th, Raleigh and Durham on the 17th, Lillington (N. C.) and vicinity on the 18th, reaching Richmond on the night of the 18th. Cars coming from Savannah should start on the 13th.

"It is the hope of the officers of your association that not only members but all of those who are interested in the 'good roads' subject will join the Capital Highway run, and that every one will do all they can to have the roads put in the best possible condition for this tour.

"This run will do more than anything else to interest the different counties and townships to improve their roads, to strengthen our organization and to give the Capital Highway publicity. It will also be an intensely interesting trip, passing through, as it does, some of the most interesting cities in the south, and a large portion of it being through probably the best agricultural country in the south. The more cars that we have in this tour the greater publicity we shall derive from it."

Mr. Tufts' project is a good one and it is to be hoped that he will have the hearty co-operation of the good roads enthusiasts of North Carolina and of the south.

Unity of Purpose in Road Construction

By HON. M. L. SHIPMAN, Commissioner of Labor and Printing of North Carolina

Unity of purpose, necessary to the success of every great and beneficial movement affecting the welfare of a people, is certainly essential in road construction. Next to actually having the good roads the most important phase of the good roads problem is a well-defined public sentiment for unity of purpose in their construction. Such a public sentiment in this State would mean the dawn of a good roads millenium in North Carolina, and it is coming right along.

Many there are who already see in the Wilmington-Charlotte, the Charlotte-Asheville highways, and the proposed Central Highway stretching clear across the State from Beaufort and Morehead City to the Tennessee line a cheering sign of this unity of purpose and who point to the New York-Atlanta highway as a

"Suppose the State were first to commit itself to a great mountain-to-the-sea turnpike, beginning, say, at Asheville and terminating at Wilmington? Suppose that to encourage the construction of feeders to this great arterial highway it were to issue its bonds in adequate amount, and deposit them with the State Treasurer to be delivered in proportion to bonds issued by the several counties for roads within their borders, planned and surveyed in accordance with the comprehensive suggestion and advice of an expert and far-seeing highway commission? Would not such a plan stir the local pride in each county? Would there not be a rush on the part of the people to obtain their proportional benefit of that for which they would be proportionately taxed? Would the counties and the people not catch the fever of doing the right thing, as well as seeing the thing to do while neglecting to do it? It would be 'up' to the people. It would be intelligent self-help. It would mark the end of bickering and usher in the era of concerted action. Each county would have its vote, each township would have its say, each citizen would have his voice. The result would be the voice of the majority—*Vox Populi*—making a sober, instead of its too often drunken echoee."

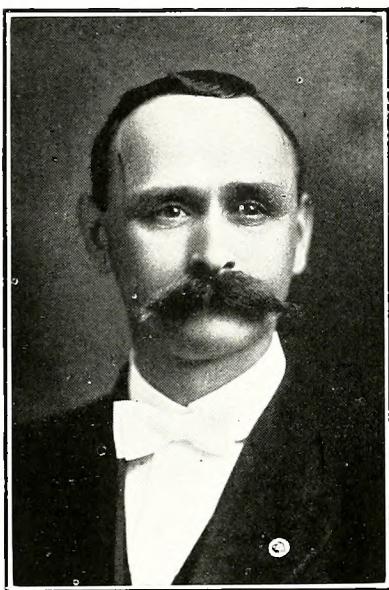
With unity of purpose in road construction much may be done quickly for the sacred cause of North Carolina's good roads. To illustrate: If Buncombe, Henderson, Haywood and Transylvania counties, which are the heart of the most magnificent mountain scenery on the American Continent, if these four counties should pool their issues and act as a unit in building good roads leading to every famed scenic point in that truly named "Switzerland of America," who would be bold enough to foretell the ultimate benefit their people would derive from their investment?

Accessibility by means of perfect roads has made Switzerland a country where poverty is absolutely unknown. Incidentally the people have become the permanent guardians of untold millions of American dollars. So would unity of purpose in road construction on the part of these western counties result in an unceasing stream of yellow metal from the pockets of American and European tourists, for Switzerland has nothing on western North Carolina when it comes to mountain scenery. This golden stream would soon return to the people of these counties their bread east upon the waters, and they would find the aforesaid bread thickly plastered on both sides with a high grade Elgin creamery product.

Unity of purpose in road construction is but another name for cooperation, that sound economic principle so little understood by the American wage-earner, while daily performing such miracles for his brother in England, where the cooperative stores do an annual business approximating in volume the total yearly earnings of the American Steel Trust.

With unity of purpose, or with cooperation, on the part of all interested, all things are possible. What would be quite absurd for one township alone to undertake, becomes a simple matter for an entire county. A task too great for a single county becomes easy for several having a unity of purpose—in road construction or in the construction of anything else.

With aid from the great State of North Carolina, or in other words with all the people of North Carolina acting with a unity of purpose, where then, would be



HON. M. L. SHIPMAN, Raleigh, N. C.

still more encouraging indication of the rapid growth and spread of an idea which means a very great deal for the public roads of this State and country.

The potential value of unity of purpose in road construction is best exemplified, possibly, in the four instances referred to. In the Asheville-Charlotte, the Wilmington-Charlotte and the Central Highway projects, the people of many different counties, in widely separated sections, are working in unity for the construction of highways which shall be of vast benefit to them all. In the New York-Atlanta highway we see the same idea carried further towards its logical conclusion, which is a National Highway, stretching from sea to sea, with numberless and far-thrown arms, in the building of which a great people will typify the true meaning of unity of purpose for all time to come.

The consummation of these four great highways projected will mark an epoch in the history of the State and show a result greatly to be desired by advocates of better roads for the entire State. I have been advocating such a policy in road construction for some years, as the following extract from an address delivered by me before the Southern Appalachian Good Roads Association, held in the city of Asheville, October 5-7, 1909, will indicate:

the insurmountable difficulty of making the Old North State a net work of good roads? And if one State may do this, why not the people of the United States, with that unity of purpose essential to the construction of good roads, why may not they decide to extend a helping hand to themselves, via the Federal treasury, and build, not only a national highway from sea to sea, but also aid in the construction of State good roads?

Without unity of purpose no great movement can realize its best possibilities. With unity of purpose, co-operation, all things are possible. With unity of purpose in road construction will come the good roads millennium, not only in this State but in the entire country.

May God in his wisdom hasten that day!

Sand Clay Roads

[By MR. CHARLES H. MOORFIELD, of United States Office of Public Roads]

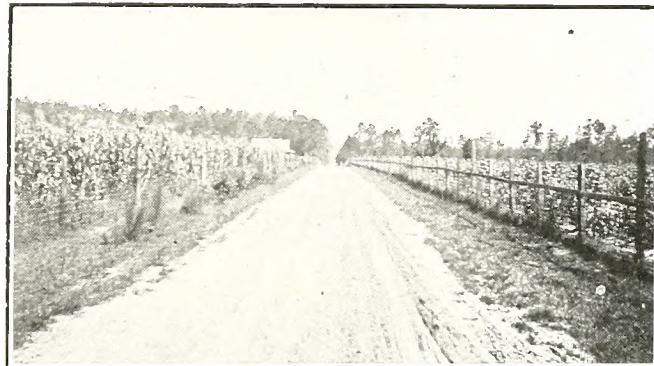
Sand-clay roads have been written about and talked about so much recently, especially in North Carolina that I feel loath to undertake any considerable discussion of this subject here.

The first thing to which I particularly desire to call attention is the necessity for standardizing and systematizing the methods of sand-clay construction so that adequate sets of specifications may be prepared for use in letting contracts. At present most of the sand-clay work is done either by county convict gangs or with free labor on force account. Now I have nothing to say against either of these plans, but in some cases where bonds are issued it is one of the conditions of the issue that all work paid for with the money therefrom shall be let to contract to the lowest bidder. This is usually a wise provision, for work can in most cases be more expeditiously and frequently more cheaply performed in this manner than any other. Most contractors, however, are unwilling to bid on work where the specifications are vague, and where so much is left to the discretion of the engineer or other official in charge. That is, a contractor doesn't like to guarantee certain definite results without having definite methods laid down for him to follow in arriving at these results. I have heard of several instances where entire bond issues were used in the construction of costly macadam roads when it would probably have been more satisfactory to have spent at least a part of the money for sand-clay, and thus have gotten, in some cases, equally as good road and much more of it. The work had to be let to contract, however, and nobody could be found to bid on sand-clay.

I am fully alive to the fact that the preparation of a set of specifications for sand-clay work in any State or even in any county is going to be a very difficult proposition for the soil conditions frequently vary considerably in the same locality. Sometimes, even within one mile, I have noticed several distinct conditions on the same road, requiring as many variations in method of treatment. Nevertheless, since we have gotten more or less out of the experimental stage with sand-clay and usually know how to meet the different conditions, it seems that we ought to be able to prepare specifications, outlining physical tests which any intelligent contractor might make for determining the character and amount of work to be done at any particular place before bidding on it. The inspector's job then would simply be to see that the work was done according to specifications. It is true that it might be found necessary after the work had started to make slight changes in the amount of clay or sand used, but this could be arranged for in the contract, and the contractor still have something fairly definite on which to base his bid.

The second point to which I wish to call attention is the general tendency to neglect grading when a road

is being surfaced with sand-clay. Wherever macadam is used, you will usually find a fairly well graded road, but, because sand-clay is comparatively cheap, a great many people seem to have the idea that it doesn't pay to bother about cutting down the bad grades, nor improving the location whenever it is practical to do so. They seem to think that any old place is good enough to dump down a long pile of sand or clay, as the case may be, spread it out and mix it with the material already there. Now, of course, that is one way to improve a road, but it is certainly not to be recommended as economical, and it is seldom satisfactory for very long. In a short time those who use the road will usually be condemning heavy grades as violently as they



Sand Clay Country Road in Lowndes County, Georgia

formerly condemned mud or deep sand. Certainly, no money derived from a long term bond issue should be spent in any such manner. Wherever money derived from bonds is spent in road improvement the price consideration should be given to grade an alignment for these are more lasting than any surface, no matter what material is to be used, and would be of benefit to the future generations compelled to help redeem the bonds, even though the surface were allowed to wear entirely away. Furthermore, the cost of maintaining a sand-clay road is very materially lessened when proper attention has been given to the grades.

The proper width for sand-clay or any other type of roads, for that matter, of course depends largely on the amount and character of the traffic, but my observation has been that the general tendency is to make sand-clay roads too narrow, especially the sand or clay variety. I don't refer to the sand-clay ribbon in particular, but to the roadway as a whole. If such a road is to stand up under traffic and weather for any considerable length of time a good wide shoulder must be provided on each side of the ribbon. This is necessary in order to keep the surfacing material from being washed off

or sheared off by the wheels of vehicles and carried away in the gutters. A wide sand or clay road is also much more easily maintained than a narrow one, and can usually be constructed for very little more, the sand-clay ribbon being the same width.

Probably one of the most important problems encountered in sand or clay work is that of drainage. In some of the counties of North Carolina it seems to be the custom for farmers to drain their fields into the public roads wherever it is practical to have the water furrows empty in that direction. On an object lesson road now under construction in one of the counties of North Carolina, there are four water furrows emptying in on the same side of the road within less than one quarter mile. This coupled with the fact that the road here is on a long and rather steep grade, has hitherto made it almost impossible to keep this road from being converted into a large gully by storm water about once each year. We have arranged not only to have a ditch provided outside of the road to carry the water from the fields, but also to turn some of the water which falls on the road off at intervals. Otherwise, it would have been almost impossible to have constructed a road safe against the heavy spring floods. In the eastern counties, however, the problem more frequently is to provide drainage for low flat places. Lack of proper drainage has probably caused more sand or clay roads to fail than any other one condition. Ample culverts and drains should be provided wherever needed for carrying the water across the road, and should be constructed of durable material. Reinforced concrete has come to be generally recognized as one of the most economical and lasting materials for short open culverts and bridge construction, and it is being more generally used for this purpose every year. The Office of Public Roads, realizing the importance of this type of construction, and the difficulty encountered by rural communities in obtaining proper designs, has created a bridge department which is now prepared to furnish advice on all matters relating to highway bridges and

culverts free of charge. Special attention has been given reinforced concrete designs for all spans from 2 feet to 50 feet. In order to secure the services of the bridge department applications should be made to Director, Office Public Roads, Washington, D. C., and should be made as far in advance of the time the work is expected to be done as possible. An article by Mr. Chas. H. Hoyt, Supt. of Construction, Office of Public Roads, appearing in a recent issue of "Southern Good Roads" explains at some length the work of this department.

In conclusion I wish to suggest that it is much better to build our sand-clay roads at the rate of a few miles each year, and build those few miles well, than to hurry over any number of miles and do work which at best will be only temporary. Each mile of good road we construct stands as a permanent invitation urging the community which uses it to build more, while work of a temporary nature done under the name of sand-clay only destroys confidence, and makes the enemies for a bond issue, which is usually necessary before much road improvement can be accomplished, all the more remote.

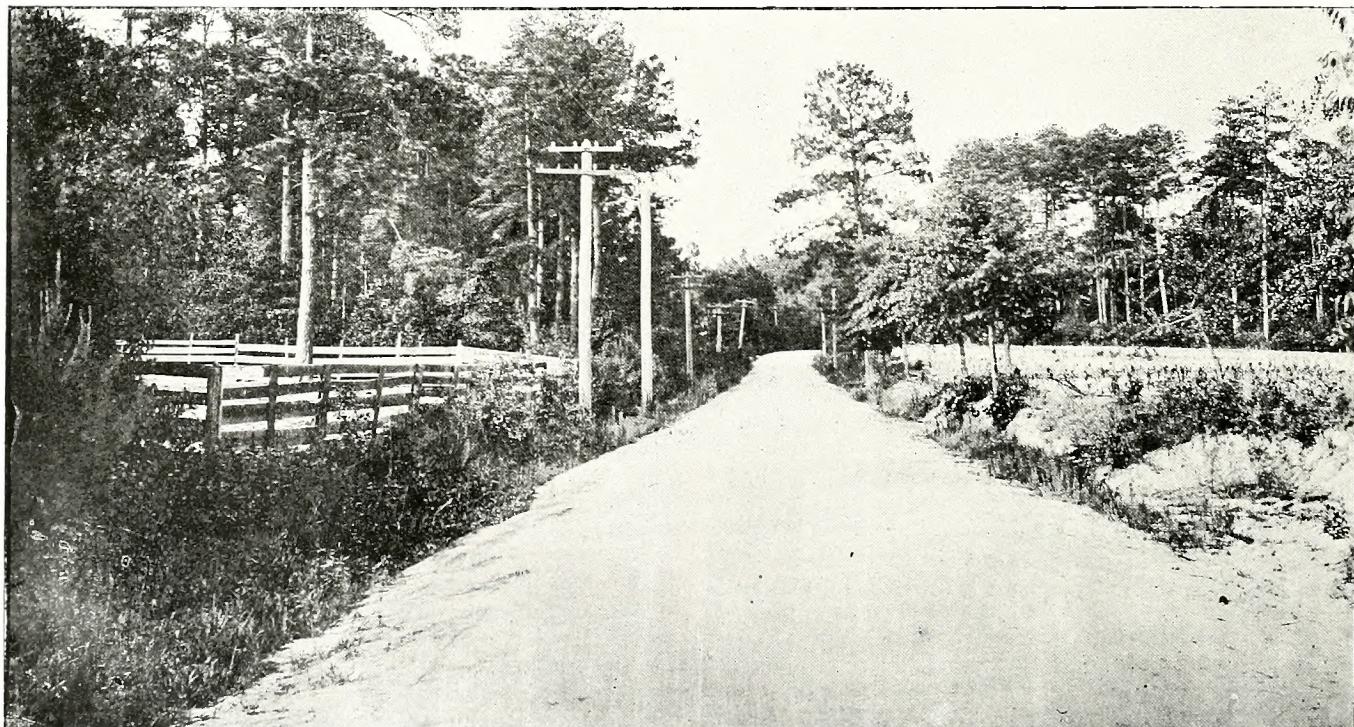
The town of Bay of St. Louis will issue bonds for \$50,000 for street improvement.

Shreveport, La., is asking for bids on about 50,000 square yards of bitulithic paving.

Smith county, Tenn., has decided to start road improvement with a bond issue of \$30,000 just voted.

The city of Duncan, Okla., has let a contract for paving eight blocks in the business section with vitrified brick.

Altus, Okla., one of the most thriving cities of that new state, has awarded contracts for the construction of 20 blocks of bitulithic paving.



Sand Clay Road Columbia, S. C.



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SEPTEMBER, 1911.

No. 3.

Southern Appalachian Good Roads Association.

Two years ago a good roads convention was held at Asheville, N. C., by delegates representing the states of Virginia, North Carolina, South Carolina, Georgia and Tennessee, the purpose of which was to stimulate the construction and maintenance of good roads in these states. The convention resolved itself into a permanent organization, known as the Southern Appalachian Good Roads Association which held its second convention at Knoxville, Tenn., and will hold its third convention at Roanoke, Va., in Oct. 4 and 5.

The object of the association has been kept constantly in view and by means of addresses, and distribution of literature the association has been able, with the hearty co-operation of the various state and county associations, to arouse an interest and demand for good roads such as has never been experienced before in these states. It has not only awakened a desire and demand for good roads in each state but the demand is now made for inter-county and inter-state roads.

At the first convention held in Asheville inter-state roads were discussed and the convention went on record, pledging itself to work for these roads and roads suggested at that time are now becoming realities. The "Mountain to the Sea" highway for North Carolina suggested at the Asheville meeting, is now well under way and is known as the "Central Highway." The Asheville, N. C.-Greenville, S. C. Highway is be-

ing pushed rapidly forward. The Asheville, N. C.-Knoxville, Tenn., road is also well under way. Another highway that is being agitated is the one from Memphis to Bristol, Tenn.

The association has also been very much interested in the National Highway and the Capital to Capital Highway, and has been instrumental in bringing the township and counties to repair certain bad links from these highways.

The successful work of this association is an assurance to the delegates to its conventions that they will be well repaid in attending them. The third annual convention to be held at Roanoke will also be of great interest and very instructive to all those who can arrange to attend.

OTHER STATESMEN FALL IN LINE.

Southern Good Roads has chronicled recently the accession of a number of influential statesmen to the ranks of the good roads advocates. Among them were Senator Simmons, of North Carolina; Senator Swanson, of Virginia; Senator Bankhead, of Alabama; Senator Galligher, of New Hampshire and a number of representatives, all advocating federal aid for highway building. During the past month, other champions have appeared and, if things do not go wrong somewhere, there will be some effective work done when congress reassembles.

Speaker Champ Clark, of Missouri, the most powerful member of the house of representatives, in a letter to President Hooper of the American Automobile Association, expresses this opinion:

"I believe the time has come for the general government to actively and powerfully co-operate with the states in building a great system of public highways. I believe the building of the Lincoln Highway would be the entering wedge for the creation of a splendid system of roads that would bring its benefits to every citizen in the country."

Congressman Borland, of Missouri, introduced a bill in the special session of Congress which closed last month, providing for the building of the great highway referred to by Speaker Clark as a lasting monument to Abraham Lincoln. Mr. Borland summarizes the matter briefly as follows:

"What we need is a monument that will be of some use to the people now living on earth. If we could have the views on the subject of the great comrade, Abraham Lincoln, himself, I am satisfied he would be in favor of such a tribute. There is no monument so enduring as a highway."

During the closing days of the session, Representative Linthicum, of Baltimore, introduced a bill establishing a federal highway and automobile commission. Mr. Linthicum was a member of the Maryland Automobile Commission which prepared the law now in force in that state. His bill provides for co-operation between the states and the federal government in the construction and maintenance of highways and prescribes regulations for their use.

Congressman French, of Idaho, also championed a good roads bill, providing for an appropriation of \$20,-

000,000 for road building and a number of other representatives introduced similar bills. With a score of the leading representatives thoroughly aroused and active, and with Speaker Clark squarely behind the movement, action may be looked for at the coming session of congress. There is nothing sectional, or partisan, about the movement, democrats and republicans lining up for it and fighting shoulder to shoulder.

In the senate there is as much, or more, interest in good roads. Senator Simmons' wonderful speech on his bill has been published in *Southern Good Roads*. Senator Swanson's bill has also been published in these columns and reference has been made repeatedly to outbursts of good roads enthusiasm in the upper house.

Senator Shelby Cullom, of Illinois, the oldest member of the senate in point of service, having been elected to that body in 1883, and one of the wisest and most conservative statesmen of our age, has come forward with a bill that eclipses everything heretofore offered by any legislator in either house. He believes that the value of the proposition justifies sufficient appropriation to give widespread benefits to the entire nation. His bill contemplates the expenditure of \$148,000,000 in the construction of 12,000 miles of good roads, radiating in all directions from Washington as a center. The seven roads contemplated in the bill will traverse almost every state in the union, and three of them will extend across the entire continent.

Of course, the matter is in its incipiency and we can hardly hope for the immediate success of a scheme so vast and that demands such large appropriations. There is no getting round the fact, however, that the proposition has its advantages and that public demand for national activity along this line is becoming insistent. It is now as certain as anything human can be that legislation and appropriation will begin to move rapidly in this direction and wise political prophets are saying that the platforms of both of the great parties in 1912 will contain earnest assurances of sympathy with the movement for good roads.

The most hopeful sign just now is the interest of the people. From Maine to California and from the Lakes to the Gulf, the people are waking up and asking embarrassing questions of their legislators and insisting on answers. If the national government can spend millions of dollars to deepen channels in unimportant rivers and harbors, and if the government can stand the price of a handsome government building in every city and near-city in the nation, the people want to know why it is that some of their money cannot be spent on public roads. The activity in congress is due to this awakening, for congressmen, both senators and representatives, are possessed of a highly sensitive touch. With their fingers ever on the public pulse, it has been no difficult task to determine the exact condition of the patient.

Every earnest advocate of good roads should see to it that public interest in road-building increases in-

stead of diminishes. Up to the present the fight for good roads has been carried on by a few heroic souls scattered all over the nation. In many states there have been a mere handful of these progressive citizens, but these conditions are rapidly changing. Constantly new apostles of progress have joined in the crusade and the movement has assumed magnificent proportions. If public opinion can be kept even at its present high pitch, congress will take action within the next twelve months.

HON. JOHN H. SMALL.

Down in eastern North Carolina there lives a real statesman. His name is John Humphrey Small, and there is nothing "small" about him but his name. He is representative from the First Congressional District and has held the job for about twelve years. From his very first term his popularity has been growing with his constituents, until today he has a wonderful hold on their confidence and their affections. They swear by John Small and the reason for their devotion is not hard to find.

Several years ago, in fact just after he was elected to the fifty-sixth congress, which was his first, he began to take an active interest in the lives and doings of his constituents. Unlike the average statesman, who grows deeply concerned about the welfare of his folks once every two years, he kept in close touch with the folks at home and every minute of his time was devoted to devising ways and means of bettering their condition. He saw to it that his district got all that was coming to it in the way of farmers' institutes and agricultural meetings of all kinds and he studied problems of drainage and water transportation. Consequently, the First Congressional District of North Carolina has made wonderful strides along all lines. Industrially and commercially the district has made wonderful progress during the past decade and it is still going forward.

Last month Mr. Small covered twelve counties of his district and organized good roads associations. At every point he delivered an address on good roads and their relation to rural life and he was greeted by large crowds. The associations formed were not weaklings, but were composed in every instance of the very best and most progressive citizens in the community. The good work that these associations will do cannot be estimated.

In this magazine last month appeared a strong address by Congressman Small outlining his position on the road question. From his effective work herein noted it is apparent that he believes in practicing what he preaches.

No ordinary prophet could foretell what would happen if every congressman in North Carolina would follow the example set by Mr. Small and it is more than finite mind can do to picture what would happen if every congressman in the sixteen southern states should follow in the footsteps of this wise leader.

It would mean a moral, industrial and intellectual revolution in the state and in the south. Oh, for more congressmen like John Humphrey Small!

NATIONAL AID AN ESTABLISHED POLICY.

In trying to impress upon the people of Texas the necessity of going out after good roads for themselves, issuing bonds and building them without waiting supinely for the federal government to bring good roads to them, Major J. H. Hawley, secretary of the Gulf Coast Good Roads Association, makes the statement that there is "no basis in the constitution to warrant the appropriation of a single dollar from the United States treasury" for the purpose of building roads.

Mr. Hawley is a live wire in road-building circles and he stands high in the Lone Star state as an effective worker, a man who does things. He is making himself felt all along the Gulf and he ranks high as an authority on the subject of good roads. While we do not believe that any state or any section should delay road-building a moment in the hope that a beneficent government will step in and bear the burden, we see nothing in the federal constitution that would keep Uncle Sam from aiding the states in building roads. For the benefit of those who doubt the constitutionality of the national aid proposition, we submit the following statistics, carefully compiled, showing what has been done in the way of national aid for various projects:

Congress has given aid in land grants to railroads, 200,000,000 acres.

Appropriations for rivers and harbors since

1875.....\$592,395,160

Appropriations for Mississippi river

levees to June 30, 1902.....16,580,614

Appropriations for Public Buildings to

June 30, 1911.....213,376,000

Land grant funds to State Agricultural

Colleges.....24,585,997

Appropriations for State Colleges of Agri-

culture, 1890-1910.....16,786,000

Appropriations for Panama Canal, estimat-

ed, will be.....400,000,000

Appropriations for road building in Porto

Rio.....2,000,000

Appropriations for road building in Phil-

ippines.....3,000,000

Appropriations for road building in Canal

Zone.....1,495,000

Appropriations for road building in Alaska

Appropriations for road building in United

States.....0

One of the express powers delegated by the constitution to the national government is the right to establish post roads and with this right would undoubtedly go the right to improve them. If the national government has no right to appropriate moneys for road-building, we do not see how it acquired the right to

appropriate millions for rivers and harbors, for state agricultural colleges and for the subsidizing of privately-owned railroads. The right of the government to make these appropriations, so far as we can learn, has never been questioned and we fail to see just why objection should be raised to national aid for road-building.

GOOD ROADS vs. BAD ROADS.

Congressman William Sulzer, of New York, sums up the argument for the plaintiff in the case of "Good Roads vs. Bad Roads" as follows:

"Good roads have a money value far beyond our ordinary conception. Bad roads constitute our greatest drawback to internal development and material progress. Good roads mean prosperous farmers; bad roads mean abandoned farms, sparsely settled country districts, and congested populated cities, where the poor are destined to become poorer. Good roads mean more cultivated farms and cheaper food products for the toilers in the towns; bad roads mean poor transportation, lack of communication, high prices for the necessities of life, the loss of untold millions of wealth, and idle workmen seeking employment."

Gentlemen of the jury, the case is with you!

Carolinians Who Enjoy Life.

Down in North Carolina there are two particularly energetic men engaged in furthering highway improvement. One of them is H. B. Varner, president of the North Carolina Good Roads Association, and the other is Dr. Joseph Hyde Pratt, the State Geologist, and the two make a pair that work exceedingly well together in harness. It naturally follows that they are mighty good shouters for the "Tar Heel" state, and of course they mention quite frequently what has been designated as the "Crest of the Blue Ridge Highway," something which it is contended will make North Carolina more attractive than anything that has ever been accomplished before. Recently President Varner visited the Blue Ridge section, and in a letter he refers to sleeping in the Watauga hotel at Blowing Rock, some 4,200 feet above the sea level, with weather so cold that he slept under a quilt, and two blankets, "like a baby in December," as he put it. The water is described as absolutely pure, and to score better "one would have to go up in the skies and meet the Rainmaker." Then the enthusiastic Carolinian goes on to say:

"We took dinner on the crest of Grandfather Mountain about 4,500 feet above sea level, with a hospitable farmer. We just dropped in and had dinner without any preparation, as we were not expected. We had the finest cornbread, made from native mountain corn and ground on an old water mill; we had loaf bread made in the mountains, which is 100 per cent better than anything that can be made in New York; we had native sorwood honey, native maple syrup, all made at home; with the finest cold boiled country ham

that you ever tasted; with butter that was real butter and had never been near ice, but was cold and crisp and like butter; we had pie and cake like mother used to make, and cold buttermilk and cold sweet milk fit for a king. I never did eat so much in all my life. It was a glorious dinner."—American Motorist.

Third Annual Convention of the Southern Appalachian Good Roads Association.

Roanoke, Va., October 4-5, 1911.

The Third Annual Convention of the Southern Appalachian Good Roads Association is to be held at Roanoke, Virginia, October 4 and 5, 1911. Since the organization of this association in 1909 the good roads cause in this section has received a wonderful impetus, as is evidenced by the increasing number of interstate highways now being successfully surveyed and constructed. It is expected that this will be the most interesting convention yet held by this association and large delegations are expected from the seven states, Virginia, North Carolina, South Carolina, Tennessee, Kentucky, Georgia, and West Virginia, which are included in the membership of this association. The program for the convention is now being assembled, and, even this early, it looks as though it will be the most interesting yet presented. One feature of the program will consist of a Question Box which will be of especial interest to the delegates, inasmuch as it will enable the individual delegates to ask questions relating to problems of road construction and maintenance met with in his own particular locality, and such questions will be answered and discussed by road experts. Among the questions which can thus be discussed and possibly some new light thrown on are those relating to location, grade, drainage, surfacing material, culverts, dust preventatives, tar and asphalt macadam, use of convict in public road construction, state aid to counties, use of wide tires, etc., etc.

The governors of the seven states interested in the convention have been asked to make addresses, and will be invited to attend the convention as guests of the city of Roanoke. All of them will probably not be present, but all the governors of these states are strong good roads advocates and are ready in every way possible to further the good roads cause throughout the Southern Appalachian region. Of the congressmen who are expected Senator Simmons of North Carolina has recently introduced a bill into the senate favoring the appropriation of \$1,000,000 a year for federal aid to states in road construction, and Senator Swanson of Virginia has introduced a similar bill.

Among the speakers who will make special addresses are:

Governor William Hodges Mann, of Virginia.

Governor Augustus E. Wilson, of Kentucky.

Governor Ben W. Hooper, of Tennessee.

Governor Cole L. Blease, of South Carolina.

Hon. Logan Waller Page, Director U. S. Office of Public Roads, Washington, D. C.

Hon. P. St. J. Wilson, State Highway Commissioner of Virginia.

Hon. E. J. Watson, Commissioner of Agriculture of South Carolina.

Hon. F. H. Hyatt, President, South Carolina Good Roads Association.

Hon. H. B. Varner, President, North Carolina Good Roads Association.

Hon. Joseph F. Bosworth, President, Kentucky Good Roads Association.

Hon. Cyrus Kehr, President, Knox County Good Roads and Park Association.

Hon. T. J. Hale, President, East Tennessee Good Roads Association.

Hon. F. M. Simmons, Senator from North Carolina.

Hon. Claude A. Swanson, Senator from Virginia.

Hon. Joseph Hyde Pratt, State Geologist of North Carolina.

Mr. S. W. McCallie, State Geologist of Georgia.

Dr. Thomas L. Watson, State Geologist of Virginia.

Hon. L. E. Johnson, President, Norfolk and Western Railway.

Gen. E. W. Nichols, Superintendent of the Virginia Military Institute.

Dr. D. H. Hill, President, North Carolina College of Agriculture and Mechanic Arts.

Mr. Y. P. Branch, Professor of Civil Engineering, Georgia School of Technology.

Prof. Hale Houston, of the Civil Engineering Department of Clemmons Agricultural College.

Prof. C. M. Strahan, Dean of the Engineering School of the University of Georgia.

Prof. M. H. Staey, of the Engineering Department of the University of North Carolina.

Mr. C. C. Gilbert, Secretary Memphis-Bristol Highway Association.



Gravel Object Lesson Road Built By United States Office of Public Roads, in August 1908, Tyler, Texas

Mr. Charles P. Light, ex-highway commissioner of West Virginia and special representative of the American Association for Highway Improvement.

Judge William H. Alston, president Bristol-Washington Highway.

Dr. P. B. Barringer, president Virginia Polytechnic Institute.

In addition to the above, there will be a number of representatives of county and local good roads associations, each of whom will bring his message of concrete import. There will also be representatives from the various interstate highways now being built, who, in short talks, will tell of the progress of the work on the highway he represents.

The headquarters of the convention will be at the Hotel Shenandoah, Roanoke, Virginia, and the meeting will be held in the auditorium of the Chamber of Commerce. Special rates are being arranged for, and, for lodging reservations, delegates should correspond with Mr. W. L. Shafer, Secretary, Chamber of Commerce, Roanoke, Virginia.

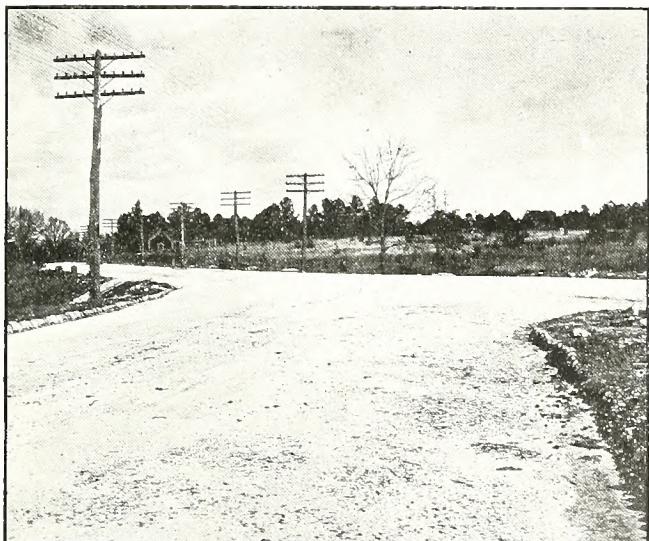
For additional information, address Joseph Hyde Pratt, Chapel Hill, N. C.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

Calhoun county, Ala., is one of the liveliest counties in that great state. Just now it is planning a step that will make it one of the leading counties of the state and of the entire south. A system of good roads has been planned and an election will be held in November to vote bonds for \$300,000 to build them. A member of the board of commissioners of Calhoun county gives out the following as the probable course of the improved roads:



Macadam Road Near Troy, Alabama

A road from Anniston to Gadsden, or to the Etowah county line, by way of Alexandria; a road from Anniston to Piedmont, via Jacksonville; a road from Piedmont to Oxford, via Choctawhatchee valley; a road from Anniston to Talladega, Via Coldwater; a road from Anniston to McFall; a road to Sulphur Springs and a road to Chattooga from Alexandria.

There is general movement for improvement of public roads in Arkansas and although there is no general state road law and no state highway commission law, the state is making progress. The last legislature authorized county judges to appoint engineers to take charge of road work, and also granted the right of eminent domain in road building. There is a state good roads and drainage association which will prepare a general road law to be submitted to the next legislature. Many of the counties are already building good roads. One important feature is a highway through Arkansas from St. Louis to Hot Springs via Little Rock now being promoted. About 5 per cent of the state roads are improved.

In a telegram to Hon. G. Grosvenor Dawe, of the Southern Commercial Congress, jointly signed by Joe Asher, county judge, and George R. Brown, Secretary of the State Good Roads and Drainage Association, appears this encouraging message:

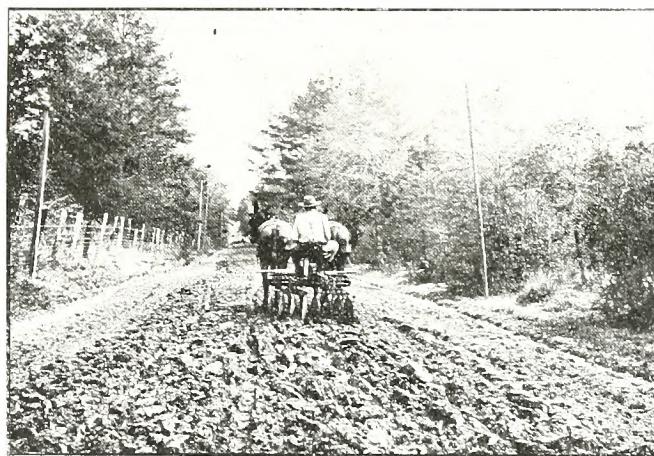
"In this, Pulaski county, we have five hundred and ten miles of road, one hundred and ten miles of first class macadam pike and sixty miles of gravel. Our county road tax is one hundred thousand dollars per

year and we spend one hundred and fifty thousand dollars per year on our roads and streets in addition to the use of our allotment of state convict labor."

Florida.

Jacksonville is the county seat of Duval county, and, about a year ago, bonded itself for one million dollars to complete its system of good roads to the county lines. This bond issue is to be sold at the rate of \$250,000 per annum, for four years. The first quarter of a million dollars was sold at 108, and was bought by local banks.

The county commissioners have been experimenting for several years, in order to ascertain the best kind of roads to build in this section, and have experimented with various kinds of shell, gravel, clay, oil, macadam, cement and vitrified brick, and have come to the conclusion that vitrified brick is the best material to build permanently good roads, largely for the reason that they are very easily repaired. These brick roads are laid on a sand base, after the grade has been thrown up, rolled and watered. The brick are laid on the flat side. One man with a wheel barrow, shovel and tamper can keep many miles of road in repair, as all the material which is necessary is a little sand which can be obtained by the sides of the roads. These roads, of course, are expensive to build, but, inexpensive to keep up. Including the grading of a 15 ft. roadway, the vitrified brick pavement has cost from \$14,000 to \$15,000 per mile. At the present time, contracts are in process of execution for about twenty miles of brick pavement in the county.



Mixing Sand and Clay With an Eighteen Inch Disk Harrow,
Near Quincy, Florida

Another great advantage of the brick roadway is the fact that it is a dustless highway, a thing very much to be desired.

Iowa.

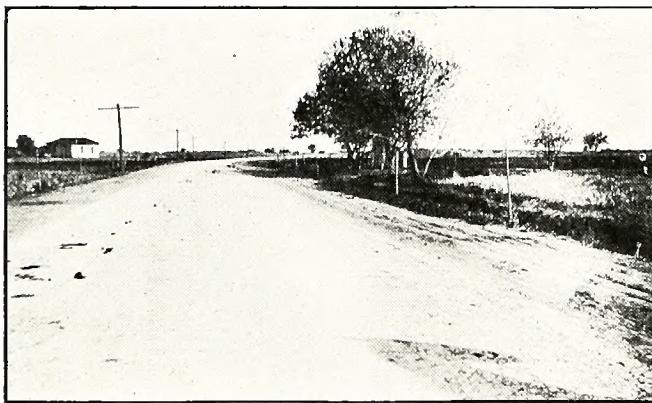
Iowa's new cross-state highway, the Blue Grass Road was officially opened August 11-17. During this time the officials and promoters of the road crossed the state, starting at Council Bluffs and following the improved highway to Burlington.

More than \$40,000 has been spent in putting this road into good shape. This money has come from donations from the farmers along the line, assisted by the business men, who are equally interested. The completion of the road is a great satisfaction to those who means, and then to place the surfacing coat of broken gave their time to its promotion. Not only has the agitation resulted in improving this road, but it has enthused the farmers living on other roads to form combinations and agreements whereby side roads will be improved and kept in as good a condition as the main road.

* * *

Louisiana.

Mr. Grosvenor Dawe, of the Southern Commercial Congress, makes public a letter written by Major F. McKerr, Chief State Engineer to National Chairman of Good Roads and Public Utilities of the T. P. A., which gives the latest good roads news from Louisiana :



Bituminous Macadam Road, El Paso, Texas

"Your letter of the 9th inst., to His Excellency, J. Y. Sanders, Governor of Louisiana, requesting certain information etc., in regard to the Good Roads movement, and Good Roads constructed, in Louisiana, has been referred to me, with a request from the governor to give the matter special attention.

As you know, road construction and maintenance in the state, on systematic broad lines, with state aid, had never been seriously taken up, nor earnestly advocated until proposed by Governor Sanders, during the early part of his administration.

Previous to that, from time immemorial, road construction and maintenance, outside of corporate limits and municipalities, had been more or less effectively carried on by and under local direction and local provision, by the proprietors of lands and the Police Juries of Parishes.

However, under the broad proposition advanced by the governor, an understanding, in the absence of state organization, was reached by which the state should furnish the services of the Board of State Engineers for all engineering work, the forces of the state penitentiary for construction work, the Police Juries of Parishes the funds for actual expenses incident to same and the United States superintendent of construction.

Under this arrangement, about 108 miles of model road were constructed, in the state, that is, some 13.5 miles in Natchitoches Parish; 29 miles in Rapides Parish; 20 miles in East Baton Rouge Parish; and 25 miles in Orleans Parish.

While some parts of these roads were surfaced with

gravel, they were mostly earth roads, graded and drained after the most approved methods. There were, of course, a number of other roads built in the state, during the same time, under former methods, by individuals, parishes, municipalities etc., some of which were surfaced with gravel, shells and other materials, the impetus to which was undoubtedly largely impelled by the activity displayed by the state.

This activity also, no doubt, gave birth to act 49 of 1910, passed at the last session of the general assembly of the state, requiring the Board of State Engineers to, under certain condition, assume control of the highways of the state.

This, the Board of State Engineers has undertaken to do, and, as an initial step, organized and equipped a highway department, which has been in operation since the first of February of this year.

Through this department, co-operating with the Parishes of the State, as provided in act of 1910, it is expected to undertake a very large amount of road building within the current year, inaugurating this by receiving proposals for the construction of some 32 miles of model earth road, extending from Colfax to Rochelle, in Grant Parish.

Advertisements for proposals to construct model roads, in Caddo, Natchitoches, DeSoto, Iberia, East Baton Rouge, Plaquemines, Franklin, Webster and other Parishes are to follow as rapidly as the surveys can be made, and specifications prepared, and the arrangements for executing the work perfected."

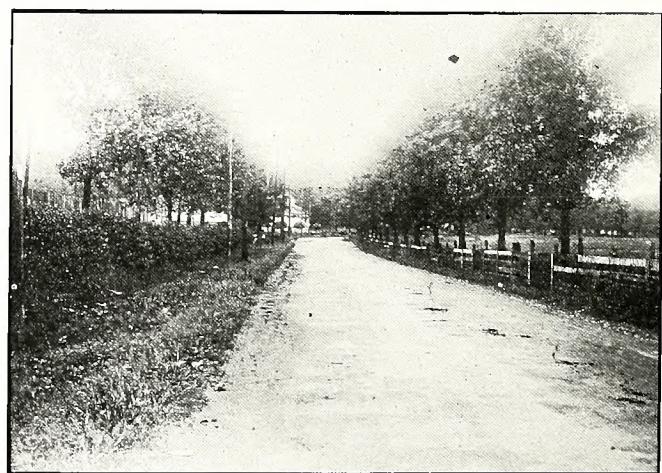
Since that letter was written, the contracts have been awarded for the Colfax-Rochelle Road, and the Mansfield to Logansport Road. This later road is in DeSoto Parish and is 19 miles long.

Four camps of convicts have been constantly at work, and have completed about 30 miles additional road.

* * *

Minnesota.

George W. Cooley, state highway engineer, and promoter of good roads in northern Minnesota, expects to see \$10,000,000 spent for good roads in Minnesota with-



Rock Asphalt Road, Bowling Green, Ky.

in the next two years under the provisions of the Elwell bill, passed by the last legislature. Under the law abutting property owners petition for the road, the county commissioners order it, the state pays one half the cost of building, the county one quarter and the property owners the remaining 25 per cent.

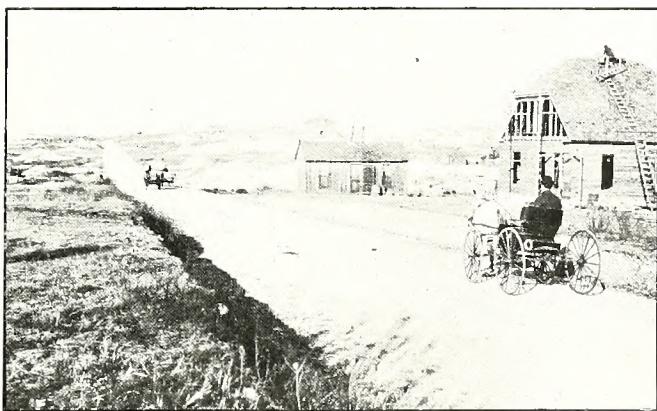
Senator J. T. Elwell, the author of the law is sponsor

for the statement that 1000 miles of roads will be built in northern Minnesota during the next year. The roads will cost approximately \$2000 a mile, but the size of the project, it is believed, will induce contractors to make reasonable prices and use modern machinery in the work. The property owner's share of the cost is spread out over a period of 10 years. After the work is done counties will be required to see that the roads are kept in repair.

* * *

Missouri.

The most signal advances in road development that Missouri has made within the past year is in the issue of bonds for road building and universally levying the full amount of local road taxes permissible under the



Road Made From Chats. By Product of Zinc Mines, at Joplin, Mo.

laws. It was not until this year that the full amount of road taxes has been so generally levied and it is the first year in which road bonds were ever issued in Missouri. While yet only two special road districts have issued and sold bonds, several other special districts are formed and are organizing for the express purpose of issuing road bonds. Bond issues for road purposes by the county is agitated all over the state while one county voted upon it in June and fell but 200 votes short of a two thirds majority. The same attempt failed two years ago by a vote of 3 to 1 against it. The advancement of the bond issue is the most sane and substantial manifestation for good roads in Missouri during the past year.

Sentiment is crystallizing for the utilization of state convicts upon the roads. The last legislature (adjourned in the spring) provided additional funds for state aid and while the question of state aid for roads is yet in its infancy and entangled, it is growing and being clarified with each session of the legislature.

Curtis Hill, State Highway Engineer says in relation to main roads:

"A continuous highway from St. Joseph, Mo., to Des Moines, Iowa is being graded and dragged this year with the view to making a good earth road of it. The improvement of the old Kings highway from St. Louis, Mo., to Little Rock, Arkansas is receiving encouragement while an improved cross-state highway across the central part of the state from St. Louis to Kansas City is meeting with more ready support within the last two months than it has within the whole period of several years agitation and work upon the idea. It now appears that at last we will have a cross-state road between our two large cities within a reasonable length of time."

A telegram from Mr. Hill says this:

"Missouri roads now about five percent improved." In 1904 the state was credited with 2.52.

Mention was made several months ago of the good work that is being done by the women of Missouri in arousing good roads sentiment and in raising funds for good roads work. The following item clipped from the St. Louis Globe-Democrat shows how these determined women work:

A lawn fete and social will be given Saturday night at Lindhurst, St. Louis county on the Hanley and St. Charles rock roads, by the Mothers Club of the Harriette School of Good Roads for Child Welfare for the purpose of raising \$200 for the improvement of Sprig Avenue road, which connects Olive street road with the St. Charles rock road, three blocks west of the Hanley road. The fund will be used to make the road passable for children going to the Harrison School.

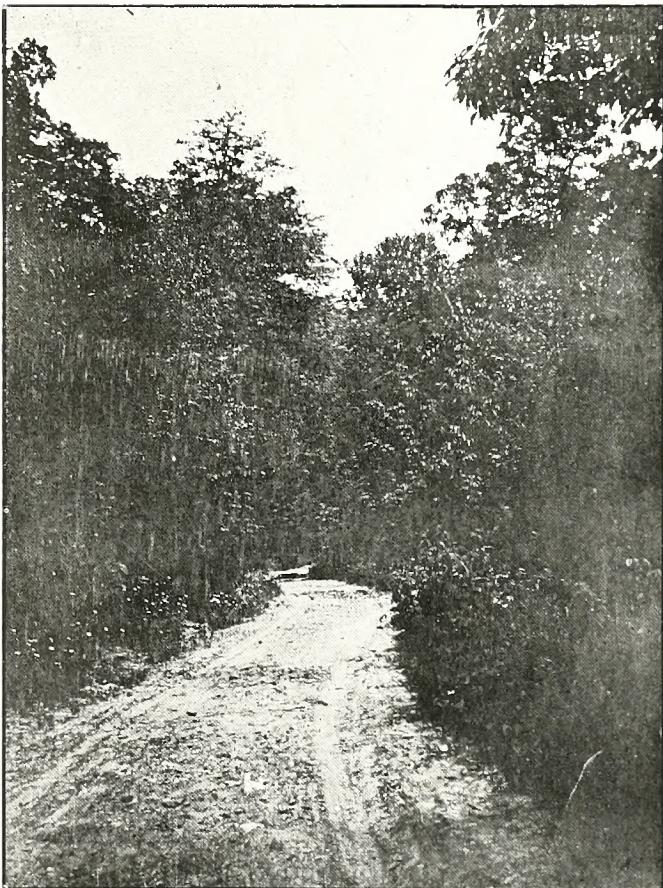
The Road Cadets of St. Louis county, two companies of boys, will give a military drill and the Pick and Shovel Club of twenty-four girls, in dark blue dresses and white aprons, also will give a drill and serve ice cream, cake, lemonade and candy. Solos and choruses in which both boys and girls will take part also will be given.

The Missouri Federation of Women's Clubs has for its ideal, a good road leading by every man's door to the school house.

* * *

North Carolina.

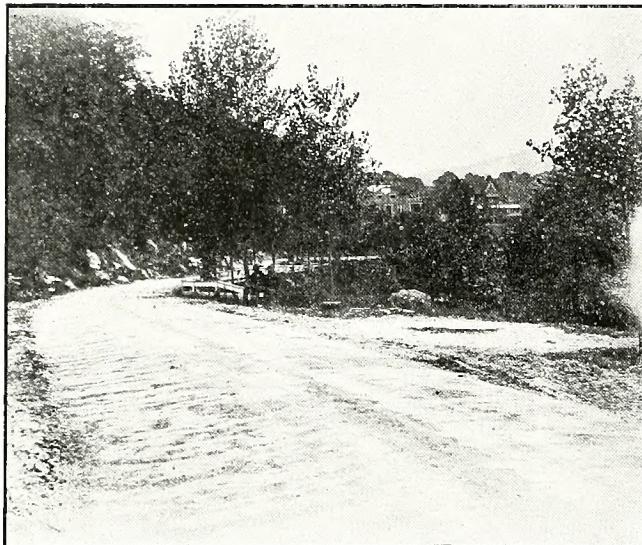
In North Carolina there has been unusual interest in road work during the past month. Much good work



A Scene on the Crest of the Blue Ridge Highway, the Old Yonahlossee Turnpike, Between Blowing Rock and Linville, N. C.

has been done along the line of the Central Highway and it now looks like the road will be able to pass in-

speetion in October when the second automobile tour will be run over the road. In Davidson county the line has been surveyed and an appropriation of \$50 per mile has been made for work on it. A large amount has been raised by popular subscription. In Boone township alone about \$1200 in cash has been raised, enough to buy a fine wheel scraper, several carts, scoops and other road building implements. The road has been well located through this county, Mr. C. M. Miller, a competent road engineer of Salisbury, doing the surveying. He will also superintend construction.



Macadam Road Near Hot Springs, Va.

In Buncombe county, where the most difficult part of the entire route is located, very fine work is being done. A big good roads meeting was held at Skymont last month at which addresses were made by Messrs. H. B. Varner and J. H. Pratt. The people of Skymont, very much aroused over the proposition have contributed largely to the fund and will build six miles of new road and surface it with sand-clay.

In Duplin county there was a big good roads rally last month. It was held at Wallace and several hundred people were present. A good roads association, the first in the county, was organized with a large membership and active campaign for a system of sand clay roads was instituted.

In Davie county there is more good roads interest than the county has ever known before. Mr. W. R. Craig, a wealthy Mississippian, now a big cotton dealer of New York city, has acquired a large estate in the county and is setting himself to the task of arousing interest in the building of good roads. A good roads meeting was held at Jerusalem, a small village in the southern part of the county last month and Mr. Craig offered to aid largely in the construction of sand clay roads in Jerusalem township. He also offered to appropriate sufficient funds to give every school in the township an eight months school term, provided the citizens would raise enough money to complete the road. Mr. H. B. Varner was the speaker of the occasion and at the conclusion of his address the citizens present voted enthusiastically to accept Mr. Craig's proposition. At a subsequent meeting Mr. W. A. Erwin, of the Erwin Cotton Mills Co., of Cooleemee, offered to contribute one half of the money necessary to extend the sand clay road from Jerusalem to Coolee-

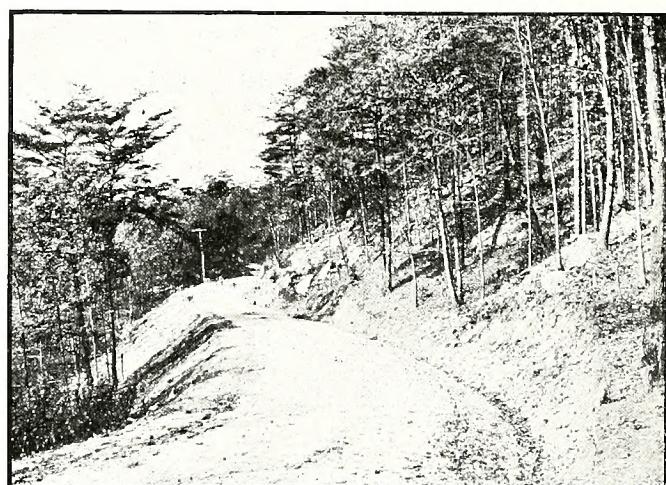
mee, a distance of three miles, provided that the citizens along the road would raise the balance. This proposition, also, was accepted and actual road construction has been begun in Davie. This progressive company has the honor of building the first, and only, section of surfaced road in the county of Davie, a stretch of macadam in the town of Cooleemee. The citizens of Davie are going at the work in the proper way and have employed an engineer to survey the roads and superintend construction.

Rowan county has about completed its section of the Central Highway. The work has been done under the direction of Mr. C. M. Miller, highway engineer. Two forces are at work, one of contract and the other hired labor. Mr. Miller writes Southern Good Roads that he has built one mile of fine sand clay road in Rowan at a cost of \$210 complete.

Down east there has been much good work done in arousing the farmers on the subject of good roads. Hon. John H. Small, congressman from the First Congressional District, has covered a large part of his district holding a series of farmers' meetings and he has seen to it that in every county visited a good roads association has been formed. He is, therefore, directly responsible for good roads associations in the following counties: Camden, Currituck, Chowan, Pasquotank, Gates, Hertford, Washington, Tyrrell, Pitt, Beaufort and Martin.

* * *
Tennessee.

The biggest thing that has ever happened in Tennessee in the way of road building is the great Memphis-to-Bristol Highway. Much has been written of this great project and the working out of the various details has been watched with interest. Hon. Charles C. Gilbert, secretary of the association which is backing this great road, has recently gone over a great part of the route and in an interview he gives the following very interesting facts:

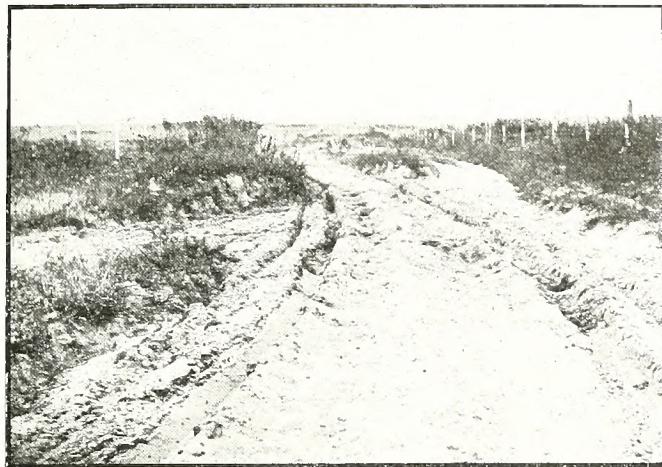


Macadam Road, Cumberland Gap, Tenn.

"It is certainly gratifying to those of us who have been so interested in the Bristol-Nashville-Memphis highway to see how thoroughly in earnest and how determined the people are to build roads. We are convinced now that not only will the main highway be built, but many others besides as an outcome of the enthusiasm and agitation which has been aroused during the past few months.

"Meetings are being planned all along the selected

route, as well as the other routes, for the purpose of maturing plans and going actually to work. From Nashville to Memphis every proposed route will soon be built. The selected route going through Waverly, Camden, Huntingdon to Jackson will always bear the name of the Bristol-to-Memphis highway, but from present indications the other two routes via Centerville and Columbia will be built just as soon and the traveler can select for himself the choice of three routes to the Bluff City.



Bad Sandy Road, Belleville, Texas.

"The people of Hickman and Perry counties have perfected an organization and will in a short space of time construct a highway to cross the Tennessee river at Perryville. This will be known as the 'central route.'

"Likewise, Maury, Lawrence, Wayne, and Decatur counties have perfected an organization and will hold a big mass meeting in Lawrenceburg to further their plans. As both of these latter routes pass through Henderson county two roads will be built to Lexington. One road will be built from there to Jackson and the Bristol-to-Memphis highway be constructed through Brownsville to Memphis, but the people of Somerville and Fayette county are not asleep. They propose to build from the Madison county line to Memphis, thereby giving two routes from Jackson. Several West Tennessee counties are already planning to connect with the highway.

"From Nashville east the commercial organizations of both Murfreesboro and McMinnville have held jollification meetings, and have taken steps to build—and that well—their portion of the highway. While they are planning, however, the road via Cookeville and Monterey is being built, and there will soon be two splendid highways from Nashville to Crossville. From there to Knoxville, for the present only one route is being planned. The highway as selected from Knoxville to Bristol will, within a year, be graded and macadamized, and there will be innumerable connecting roads built to it. One of the first is Cocke county, the home of Governor Hooper. That county expects to build a road to connect with the highway in Jefferson county, and one to connect in Greene county. This county is building some splendid roads. The rural route carriers in Cocke county have ordered fifty Bristol-to-Memphis buttons.

"The people of Grainger and Hawkins counties are determined to have a highway also, and within a short

while will throw open to the public a road equally as good as their neighbor counties across the river.

"The greatest good which will come from the Bristol-to-Memphis agitation will be in convincing the people that they need roads, and when this is once done there will be no question about improved highways in this state."

GOOD ROADS NOTES IN BRIEF

The city of Concord, N. C., has awarded contracts for sidewalks amounting to \$6,000.

At Columbia, Mo., the road commissioners have called an election for this month to decide on a bond issue of \$100,000 for roads.

Kansas City, Mo., has awarded contracts for paving amounting to \$55,000 recently and much more work is contemplated.

The old town of Salem, N. C., is to hold an election soon to vote on a bond issue for street improvement.

At Point a la Hache, La., it has been announced that the highway department has awarded contracts for shell roads to cost \$100,000.

Bennington, Okla., asks for bids on 40,000 feet of cement side walks.

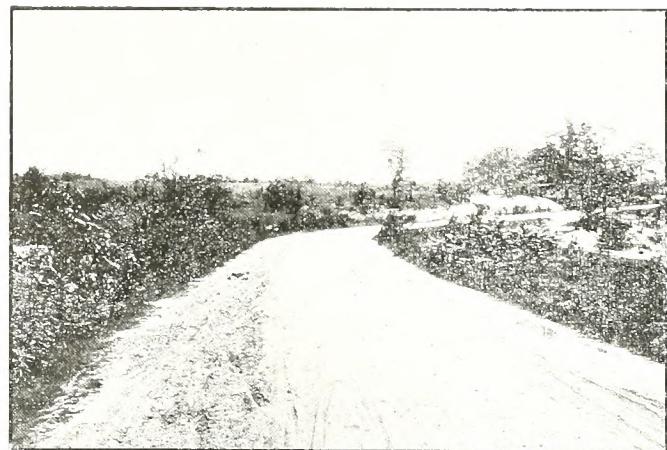
Brooksville, Fla., has \$20,000 available for street improvement and \$6,000 for side walks.

Simpson county, Ky., will build 14 miles of road, 12 miles of which are piked, at a cost of about \$10,000.

District No. 1, Denton county, Tex., will build sixty-five miles of good roads.

Lewisburg, W. Va., will spend \$16,500 on street improvement.

It has been decided that the street improvement to be done in Memphis, Tenn., will be divided as follows:



Granite Macadam, Clemson College, S. C.

Asphalt, 45,590 square yards; Concrete foundation, 35,540 square yards; Bituminous Macadam, 1467 square yards; Gravel, 11,700 square yards.

At Portsmouth, Va., \$50,000 is to be spent in street improvements.

Grainger county, Tenn., has been asking for bids on the construction of ten miles of macadam.

The city of Winston-Salem, N. C., has apportioned \$37,500 for street work for the coming year.

The commissioners of Fulton county, Ga., have been asked to create the office of county engineer at a good salary and to employ a man of ability to fill the office. The engineer will be expected to give his entire time

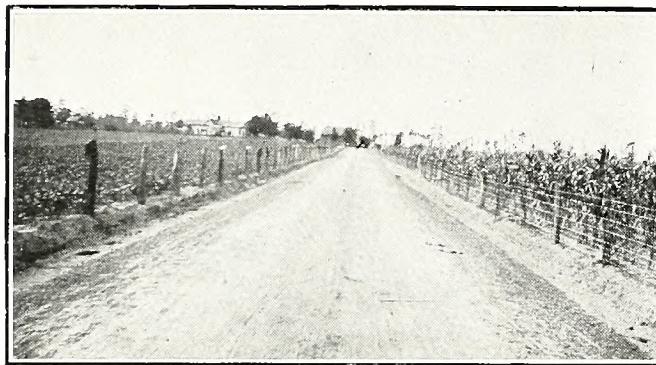
to the improvement and maintenance of the highways of Fulton county.

Buffalo district of Leon county, Tex., has voted bonds for \$50,000 for road construction.

The city of Coleman, Tex., will start street improvement on a bond issue of \$25,000 recently voted.

Sweetwater, Tex., has issued bonds for \$35,000 for street work.

Abilene, Tex., will vote soon on a bond issue of \$150,000 for street improvement.



Sand Clay Country Road in Colquitt County, Georgia

Escambia county, Ala., will vote November 14 on a bond issue of \$100,000 for good roads.

Young county, Tex., will hold an election September 23rd, to decide on a bond issue of \$100,000 for good roads.

Perry county, Ala., will vote October 2nd on a bond issue of \$110,000 for road construction.

Palo Pinto county, Tex., expects to vote this fall on a bond issue of \$300,000 for good roads. Petitions have been circulated and largely signed asking that the election be called.

Beaumont, Tex., has started work on seven miles of cement sidewalks.

Brownsville, Tex., is spending a large amount on wood block paving. More than 25,000 square yards of this variety of pavement has been contracted for.

Duval county, Fla., has awarded contracts for sand clay roads amounting to \$18,200.

In Louisville, Ky., contracts have been let for paving amounting to \$57,600.

Buncombe county, N. C., which has built many miles of macadam road, has decided to try sand clay roads and has let the contracts for 12 miles of this sort of road.

Dallas, Tex., will spend \$62,000 on bitulithic paving.

Walton county, Fla., has mapped out thirty five miles of road that are to be graded and surfaced with sand clay. A bond issue of \$70,000 is available for the work and will be sufficient, according to the official survey, to build the roads.

Ten miles of dirt road are to be built at Floyd, La., at a cost of \$7,500.

Lee county, Va., has awarded contracts for the grading of sixty miles of road and the macadamizing of eighty.

An association has been formed at Sumter, S. C., to build a highway between Sumter and Columbia.

The city of Tampa, Fla., will spend \$700,000 in improving streets.

Polk county, Fla., is in the midst of a campaign for a bond issue for \$500,000. The election will be held October 10.

The city of Burlington, N. C., has sold \$35,000 of bonds for street improvement.

Carter county, Tenn., has voted a bond issue of \$60,000 for road building.

Logan, W. Va., has voted bonds for \$15,000 to improve streets.

Wood county, Tex., has sold \$50,000 of bonds recently voted for good roads.

Murphy township, Cherokee county, N. C., has sold bonds for \$50,000 for road improvement.

Fort Mills, S. C., is preparing to issue bonds for street improvement.

Cullman county, Ala., is planning to issue bonds for \$500,000 to build a system of first class roads.

Fulton county, Mo., will hold an election soon to vote on a bond issue of \$100,000 for good roads.

Logan county, Ky., will build a fine highway through the county.

Green county, Ga., will vote in October for a bond issue for road improvement.

Precinct No. 1, Falls county, Tex., will vote soon on a bond issue of \$25,000 to begin road improvement.

Berkley district, Spotsylvania county, Va., will vote on a bond issue of \$30,000 soon to improve 26 miles of road.

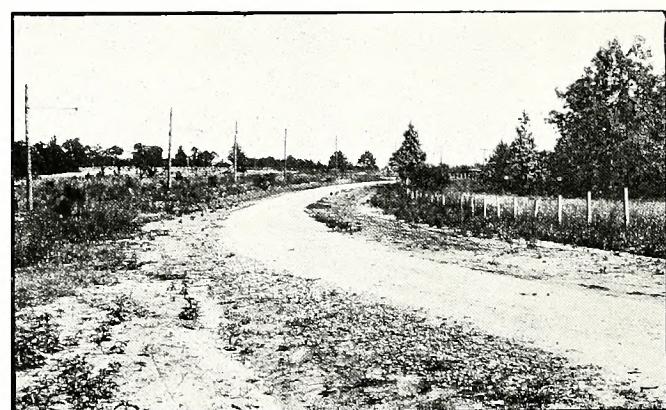
McCullen county, Tex., votes this month on a bond issue of \$25,000 for road work.

Tulsa county, Okla., votes on the 19th of this month on a bond issue of \$500,000 for road building.

District No. 1, Lincoln county, Miss., has awarded contract to grade and level 28 miles of road and construct many bridges and culverts.

The city of Hammond, La., has awarded contracts for 6 1/2 miles of concrete sidewalks.

Lexington, Ky., has awarded contracts for 23,000 square yards of paving.



Object Lesson Road, Built by United States Office of Public Roads,
Greenville, S. C.

The town of Longview, Tex., has awarded a contract for 17,000 square yards of paving to cost \$60,000.

Blount county, Tenn., has awarded contracts for road building aggregating \$320,000.

The city of Newbern, N. C., has contracted for a large amount of paving.

The city of Aiken, S. C., has awarded contracts for 73,000 square yards of paving.

The town of Bastrop, Tex., will pave three of its principal streets with macadam.

Franklin, La., will build 91,000 square yards of paving and 48,000 feet of curbing.

Lee county, Ga., is planning to issue bonds and do a great deal of road construction.

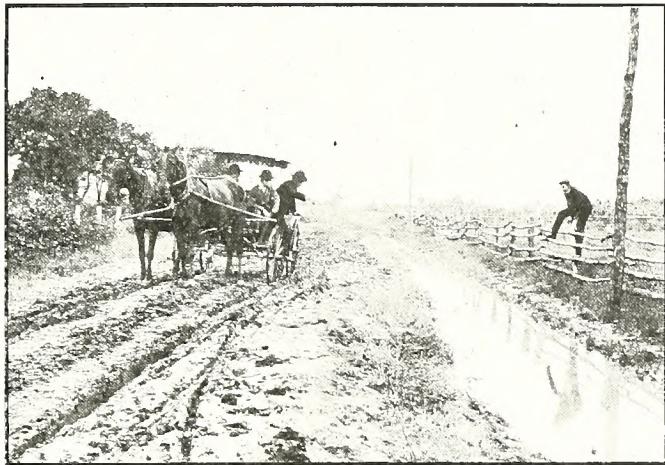
Districts one, two and three, Nassau county, Fla., will vote September 12 on a bond issue of \$60,000 for roads.

Grainger county, Tenn., will grade and surface 15 miles of road.

Bexar county, Tex., will build a good road from San Antonio to the Gulf of Mexico.

Fayette county, Tenn., will build a good road from Somerville to Memphis.

Tazewell county, Va., is building 35 miles of macadam roads.



Bad Road, Lebanon, Mo. With proper drainage and the use of the Split Log Drag this would be a good road at least ten months in the year

Taylorsville and Ellendale townships, Alexander county, N. C., are building three miles of surfaced roads.

Hamilton county, Tenn., has awarded a contract for sheet asphalt construction to cost \$75,000.

Marlin, Tex., has voted a bond issue for street paving.

Bluefield, W. Va., has let contracts for grading and macadamizing several streets.

Crowley, La., has awarded contract for building cement sidewalks on 460 blocks.

Jackson county, Mo., has awarded contract for grading 16 miles for macadam.

The city of Shreveport, La., will pave with asphalt, concrete and other materials, spending about \$400,000.

Wise county, Va., has contracted for grading 10 miles of road.

Precinct No. 1, Texarkana district, Ark., which voted bonds for \$250,000 for road building last year, now has 12 miles of good roads built.

Lamar county, Ark., has voted bonds for \$300,000 for road building.

Miller county, Ark., is planning to issue bonds for \$500,000 to build a system of roads.

A company has been chartered for Carteret county, N. C., to build the Carteret section of the Central Highway. It has a capital of \$25,000.

Monroe county, Ky., will spend \$25,000 in building eight miles of road.

Humphreys county, Tenn., has \$25,000 immediately available for road improvement.

Dorchester county, Md., is constructing two macadam roads.

Alexandria, Va., will pave four streets.

Washington county, Tenn., has issued bonds for \$40,000 to build its section of the Memphis-Bristol Highway.

Roane county, Tenn., will spend \$25,000 in road work.

Knox county, Tenn., is asking for bids on the resurfacing of seven miles of road.

Louisville, Ky., will spend \$10,000 on vitrified brick paving.

Beaumont, Tex., has \$25,000 available for immediate use in paving streets.

San Jacinto county, Tex., has voted a bond issue for road building.

Walton county, Fla., has voted a bond issue of \$70,000 for road improvement.

The city of Grainger, Tex., will spend \$15,000 on street improvement.

Justice precinct No. 7, Leon county, Tex., has issued bonds for \$30,000 for road work.

Palmetto, Fla., has bonded itself for \$20,000 to build streets.

Jackson county, Ala., will begin road improvement with the proceeds of a \$30,000 bond issue just voted.

Talcott district, Sumner county, W. Va., has issued bonds for \$55,000 for good roads.

The city of Winston-Salem, N. C., will spend \$75,000 on street improvements, the proceeds of a bond issue voted last month.

Cumberland county, N. C., votes November 14 on a bond issue of \$200,000 for road building.

The commissioners of Grady county, Okla., have authorized a bond issue of \$40,000 to build roads. Grady county is planning a system of highways second to none in the state.

BRIDGES & CULVERTS

A contract has been awarded at St. Louis, Mo., for the steel superstructure of the western approach to the municipal bridge for \$426,997.

Lancaster county, S. C., will build a reinforced concrete bridge across Lynches creek.

At Roanoke, Va., \$32,000 is to be spent in building a steel bridge across the Roanoke river.

Gassaway, W. Va., has voted bonds for \$15,000 to build a bridge.

Cabell county, W. Va., is preparing to build a bridge across Russel's creek at a cost of \$20,000.

Yell county, Ark., will build a steel bridge across Petit Jean river.

Clay county, Ark., has let the contract for a bridge across the Little Black river.

Cortez, Fla., will build a bridge across Sarasota Bay to cost \$15,000 with the proceeds of a bond issue recently voted.

Waycross, Ga., will construct a number of iron culverts in connection with extensive street improvements now going on there.

Vicksburg, Miss., will build a bridge across Glass Bayou at a cost of \$13,000.

At Kansas City, Mo., the county court has asked for bids on ten steel bridges to be built at an estimated cost of \$38,000.

Brazoria county, Tex., is asking for bids on two bridges across the Brazos river at Columbia and Brazoria.

Henderson county, N. C., will build two bridges across the French Broad river.

Nicholas county, W. Va., will build a bridge across Cherry river.

Limestone and Lauderdale counties, Ala., are preparing to erect a bridge across Elk river.

At Washington, Va., bids are being asked for the construction of two fine steel bridges across the south branch of Thornton river.

Bids are being asked for the construction of three re-inforced concrete bridges near Leesburg, Va.

Jefferson county, Ark., will build a bridge across the Arkansas river.

Greene county, Ga., is contemplating a bond issue to provide funds for a great many new bridges needed in that county.

At New Orleans, La., one of the biggest bridge undertakings ever planned in the south, is now under consideration. The bridge is to connect St. Tammany parish and New Orleans, crossing Lake Pontchartrain. It will be 22 miles long and will cost \$6,500,000.

The city of Springfield, Mo., will vote on a bond issue of \$100,000 for bridge construction.

Rockingham county, N. C., is asking for bids for repairing several bridges and building five new ones in different parts of the county.

Lexington county, S. C., will build an expensive bridge across the Saluda river.

Yazoo county, Miss., is to build a bridge across Bear Creek.

Hawkins county, Tenn., will spend \$20,000 on a bridge across the Holston river.

Dallas county, Tex., will set aside a large part of the \$500,000 bond issue voted recently for bridge and culvert building.

Bids are asked for two steel bridges in Dickenson county, Va.

Loudon county, Va., is asking for bids on two concrete bridges.

A bridge is to be built at Grafton, W. Va., that will be 754 feet long and cost about \$30,000.

Road Statistics of North Carolina

By MR. LEONARD TUFTS, President of Capital to Capital Highway Association

The following figures are suggested by an article in the American Motorist, page 225, and titled "Are the States Able to Build Enduring Roads?" As near as I can ascertain the following figures apply to North Carolina:

Area of state, 52,250 square miles.

Miles of road in State, 46,850.

State's assessed valuation and taxable property, \$469,925,130.00.

The average county area in square miles, 522.

Dimension of the average county if squared, in miles, 23x23.

Miles of road in average county, 468.

The valuation of taxable property of average county, \$4,699,251.00.

Assessed valuation liable to taxation per mile of road, \$10,000.

Assessed valuation liable to taxation per square mile of State, \$9,000.00.

The following assumptions are made:

That the tax rate for roads is 25 cents on the \$100.00.

Cost of maintenance of earth roads, gravel roads and sand-clay roads is \$10.00 a mile per year.

Cost of maintenance of macadam roads is \$500.00 a mile per year.

Cost of construction of sand-clay or gravel road is \$500.00 a mile.

Cost of construction of macadam road is \$5,000.00 a mile.

Annual road tax for State, \$1,174,813.00.

The average annual road tax for county is \$11,748.00.

The annual road tax for each mile of road in State, \$25.00.

Cost of maintenance of roads in State if all were earth, gravel or sand-clay, \$468,500.00.

Cost of maintenance if all roads were macadam in State, \$23,425,000.00.

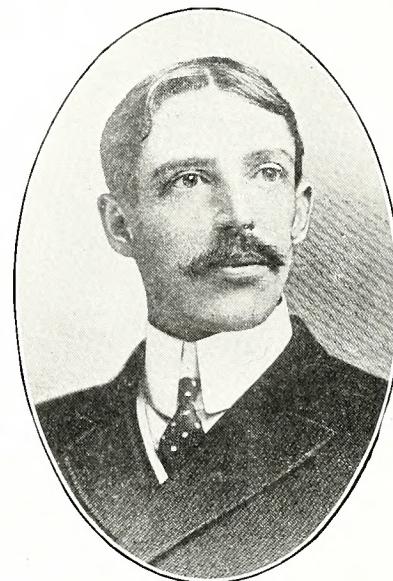
Cost of maintenance if all roads were earth, gravel or sand clay in average county, \$4,680.00.

Cost of maintenance if all roads were macadam in average county, \$234,000.00.

If squared and roads were built on gridiron plan

the average county would have five roads across it in each direction 4 6-10 miles apart.

If sand-clay or gravel roads are built as money is received from taxes and old dirt roads maintained there can be built in the State annually 1,413 miles or 14 miles in the average county or in ten years 14,130 miles in State or 140 in county.



HON. E. J. WATSON

Commissioner of Agriculture, Columbia, S. C., who will deliver an Address before the Southern Appalachian Good Roads Association, Roanoke, Va., October 4th and 5th.

If old dirt roads are properly maintained and macadam roads are built and maintained as money is received from taxes there can be built in the State: 1st year, 141 miles; 2nd year, 127 miles; 3rd year, 115 miles; 4th year, 104 miles; 5th year, 93 miles; 6th year, 84 miles; 7th year, 76 miles; 8th year, 69 miles; 9th year, 62 miles; 10th year, 56 miles. Total, 927 miles in ten years or 9 1/4 in the average county in ten years.

The average county can maintain old and new roads and build a macadam road across itself about once every 25 years if the county is square.

The average county can maintain old and new roads and build a sand-clay or gravel road across itself about every year and a half if the county is square.

The average county can bond itself (20 year bonds) for 138 miles of sand-clay or gravel roads and keep the roads in repair and pay sinking fund and interest. This will make 30 per cent. of improved roads.

The average county can bond itself (20 year bonds) for eight miles of macadam roads and keep the roads in repair and pay sinking fund and interest. This would make less than 2 per cent. of improved roads for the county.

The average square mile in the State would receive for roads \$23.00 each year.

The above figures indicate how much further a dollar will go on a sand-clay road than on macadam. Of course the figures are not all accurate and a good many assumptions have been made. I presume that undoubtedly there are many sections where macadam roads can be built for less than \$5,000.00 per mile; on the other hand there are many sections where sand-clay roads can be built for \$250.00 per mile. Again the care of macadam roads in some sections will not cost \$500.00 per mile a year but there are records where good sand-clay and gravel roads have been maintained for as low as \$5.00 a year. There are many sections of the State where sand-clay and gravel roads, I presume, are impracticable and macadam is the only material that can be used.

In the question of the bonds, the figures that are given here are not according to the way they would work out in actual practice, because improvement of property would easily take care of the interest and sinking fund. Then again 25 cents on the \$100.00 for the whole State would raise but \$1,174,813.00 and probably for the present 25 cents on the \$100 is as high a rate of taxation on an average as people would stand, although from Dr. Pratt's figures in his good roads circular No. 68 he points out that the actual saving to the people of the State annually would be 10 times this amount. If the people of the State would stand a tax of \$2.50 on the \$100.00 worth of property for two and one-half years it would make it possible to build every road in the State out of sand-clay or gravel, estimating that the roads would cost \$500.00 per mile. Of course as I have said before, some parts of the State would have to use macadam, which is necessarily more expensive, but there are other sections where roads can be built as low as \$250.00 per mile.

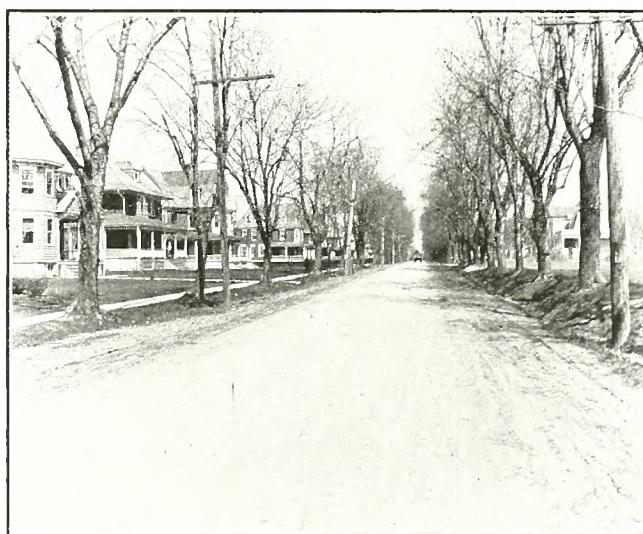
If there are 370,000 horses and mules in the State it would pay the owners of these horses and mules to pay \$30.00 tax for three years for every head for the improvement of the roads and unless they increase their farming it is probable that one-fifth of the horses and mules in the State would be for sale at the end of that time.

Amiesite Grows in Popularity.

Amiesite, the wonderful road building material manufactured by the Amies Road Company, continues to grow in popularity. The company is now doing a large business in the old and established territory in the east, every plant running at its full capacity and unable to manufacture Amiesite fast enough to fill orders.

In competition with every bituminous road material

on the market the Amies Road Company recently was awarded the contract to surface with Amiesite the famous Shore Boulevard between Absecon and Somers Point, near Atlantic City, N. J. This boulevard is nine miles long and thirty six feet wide, and when surfaced with Amiesite will be the finest automobile highway in the country. Another contract was awarded the Amiesite people a few days ago in Mercer county, N. J. The road from Princeton to Trenton, four miles in length, is to be laid with Amiesite eighteen feet wide. In Oyster Bay, the home of ex-president Roosevelt, the company is laying 25,000 square yards and along the White Horse Pike, the main automobile road between Philadelphia and Atlantic City, 85,000 square yards is being laid.



Amiesite Road. White House Pike, Camden County, New Jersey. Built under the supervision of the County Supervisor, August 1909, photographed July, 1911. This is the main highway between Philadelphia and Atlantic City, which carries not alone the heavy trucking traffic from New Jersey into Philadelphia, but is also the finest and fastest piece of road in the State of New Jersey for motor vehicles.

A score of other contracts are being carried out now and the company has much more in sight. It is enlarging its field of operations rapidly and is doing business now in New York, Pennsylvania and New Jersey, as well as in some other states. So far it has made no headway in the south, but this will come later, as Amiesite has merit as road building material and in the end, this will tell. The best material available is none to good for road-building, where roads are properly graded and located, and the people of the south will learn this.

The Amies Road Company has a very attractive ad in this issue of Southern Good Roads.

Manufacturers' Convention at Richmond Nov. 20-23, 1911.

As a result of a joint meeting of manufacturers of road machinery and materials and representatives of the American Association for Highway Improvement held in New York, plans have just been formulated by the committee appointed at this meeting for a convention of manufacturers at the great road congress of the American Association at Richmond, Va., Nov. 20-23, 1911.

The manufacturers will hold their meeting on the afternoon of November 21, following the sessions of the highway engineers, contractors and officials, and at

that time expect to perfect a permanent organization for the purpose of aiding the cause of road improvement and to co-operate with the American Association and other similar organizations.

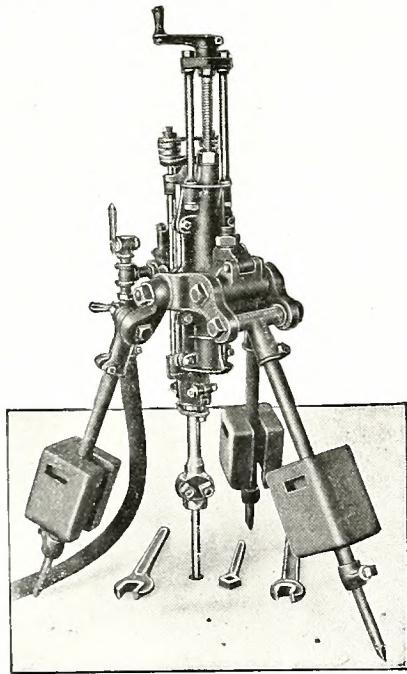
Pending the formation of a permanent organization of manufacturers at Richmond, the committee appointed at the New York conference is actively co-operating with the American Association for Highway Improvement in its efforts to make the Richmond congress the most important and influential event of its kind ever held, as well as aiding the association to make its general work most effective. The manufacturers' committee is composed of Nat Tyler, Jr., president of the Monarch Road Roller Co., Chairman; Daniel T. Pierce of the Barber Asphalt Paving Co., Secretary; J. A. Robeson, president of the Robeson Process Co.; C. E. Woodbridge, of the Texas Co.; W. T. Beatty, of the Austin-Western Co.; George H. Lewars, of the Good Roads Machinery Co., and J. E. Pennybacker, Jr., Secretary of the American Association for Highway Improvement.

No exhibits of machinery or materials will be made at the Richmond congress, as it appears to be the unanimous opinion of the manufacturers that exhibits have proven unsatisfactory in the past and should be eliminated as a feature of all future road conventions.

The Improved "Wood" Rock Drill.

For years the Wood Rock Drill has been recognized as the foremost drill manufactured and its various superior features have been proven in the hardest tests

any tool could be made to undergo. Every effort has been made to keep pace with improvements in the metal industry and recently features were added that are so important in their result that it is called the Improved Wood Rock Drill. This improvement lies chiefly in making those parts, upon which the greatest wear and strain comes, of Vanadium Tungsten Iron, instead of the grey cast iron generally used for that purpose. With-



out any question that improvement makes the Wood Rock Drill the strongest, the longest-lived, the most saving and the best-working drill now sold.

The parts made of this remarkable new metal are the cylinder, the chest and the air head—which have to withstand the greatest wear in any drill.

The wearing qualities of Vanadium Tungsten Iron are truly wonderful. It has been shown to have in one case a tensile strength of 45,000 lbs., where ordinary cast iron has only 18,000. Instead of crystallizing, it actually hardens under friction, giving 200 per cent more wear. It is at least 100 per cent stronger than the ordinary iron used for mak-

ing cylinders. When the Vanadium alloy is added to iron, it not only cleanses it of oxides and nitrides, but it has the strongest refining effect, which eliminates porosity. Good grey cast iron is porous, whereas the Vanadium iron is as close-grained as silver. A comparative chemical analysis is most striking. Vanadium is so hard it can hardly be cut with a file and it is absolutely impossible to break it by any ordinary means; its abrasive qualities far surpass those of any other metal or alloy.

This not only means that the Improved Wood Rock Drill will wear longer. It will also work better, for the Vanadium Iron gives a free movement to the piston never before obtained, increasing the speed and force of each blow struck. Moreover the air head cannot now chip or peel off, due to the rapid stroke of the piston, and resulting in leaks.

Another thing. Bronze is the most durable and the best anti-friction metal used for bearings. The Improved Wood Rock Drill for Steam has the longest bronze bearing of any rock drill made, further reducing the friction and the wear in the tool.

Every feature of this new Wood Drill has been thoroughly tried out for months with investigations and experiments. The results show that it gives the greatest wear, the easiest operation, increased services—all meaning actual saving of money.

With Southern Good Roads Advertisers.

Jim Fellowes' striking talk in this issue of Southern Good Roads calls attention to some of the merits of the famous Watson wagon. This wagon is manufactured by the Watson Wagon Company, of Canastota, N. Y., and is one of the most reliable wagons ever placed on the market. It costs a little more than other makes, but it undoubtedly has virtues that others do not and the company invites investigation both of their product and of the products of other factories, confident that in any sort of a fair test the Watson wagon will win.

Glutrin, the wonderful road binder manufactured by the Robeson Process Company, of Washington, D. C., continues to grow in favor. Glutrin is a great road preservative and helps to cut down the cost of yearly maintenance. It is not an unreasonably high product and will help road-builders everywhere to build more miles of good road for the same money.

The Southern Railway Company, through its land and industrial department, of which Hon. M. V. Richards is in the head, is doing a great deal of efficient good roads work. In this issue of Southern Good Roads there is an ad telling of the advantages waiting for the farmer in the great Southeast, where good roads are being built everywhere. In no other section of the country is good roads sentiment so widely prevalent and so compelling. The story told in the page ad are being built everywhere. In no other section of the

There is a difference in road machines and every road builder who is contemplating investing money in machinery should do some careful investigating. In this issue the Ohio Road Machinery Co., of Oberlin, O., and Atlanta, Ga., advertises two of their very efficient machines, showing cuts of them.

There is no better town in Virginia than Roanoke, where the Southern Appalachian Good Roads Convention is to be held and the delegates to this convention will receive a warm welcome there. In this issue of Southern Good Roads the Roanoke Chamber of Commerce has an advertisement setting forth a few of the inducements the city has to offer for home-seekers

of all kinds and classes, and it can be said truthfully that Roanoke offers exceptional advantages.

The North Carolina Metal Culvert Company, of Greensboro, N. C., is turning out a product that is finding ready sale in all parts of the south. Their American Ingot Iron Culvert Pipe cannot be excelled on the market today. In their ad in this issue of Southern Good Roads they offer to send literature of interest to road-builders.

The test of every road-building material is the service that it gives under actual traffic conditions. In this number there is a full page ad setting forth a few of the good qualities of Tarvia, a famous road-surfacing material manufactured by the Barrett Manufacturing Company, of New York. In this advertisement appears statements from Major W. W. Crosby, chief engineer of the Maryland Road Commission, and Mr. J. C. Little, city engineer of Annapolis, Md., paying Tarvia a high compliment. The man interested in road-binding and road-surfacing material, should read this.

If you have bridges to build, the advertisement of the Virginia Bridge and Iron Company, of Roanoke, will be of interest. In this ad is mentioned one case in which one customer was saved \$5,000 by securing a bid from this progressive company. Their product is as good as the best and their service is all that could be desired.

Any explosive branded "DuPont" is guaranteed to give satisfaction and nothing but satisfactory service is expected of it. The E. I. DuPont de Nemours Powder Company, of Wilmington, Del., has an ad in this issue of Southern Good Roads calling attention to their explosives and to the work that has been necessary to bring them to their present high state of efficiency. The company has a corps of experts on its staff at all times, ready and willing to give advice and assistance wherever needed.

For many years Trinidad Liquid Asphalt, the great road dressing brought from the lakes of Trinidad, has been popular all over the United States. It is a permanent constructive agent and it gives satisfaction. In this issue The Barber Asphalt Paving Company, of Philadelphia, calls attention to a few of its merits in a most convincing way.

In their advertisement in this issue of Southern Good Roads the Indian Refining Company offers a piece of very convincing evidence as to the durability and the satisfaction-giving qualities of their famous Indian Liquid Asphalt. This product stood the strain of the great Automobile Prize Races at Savannah, Ga., in November, 1910, and gave perfect satisfaction. It has been tried in Forsyth, Guilford and Mecklenburg counties in North Carolina with results that more than pleased.

No railroad in the United States boasts better equipment than the Norfolk & Western, which has an ad in this issue of Southern Good Roads telling of some of the comforts and conveniences it has to offer the travelling public. The advertisement is worth reading. The Norfolk & Western is progressive in every way and believes in good roads. All along its line it is offering the people special inducements to get them to build good roads. They haul building stone and good roads machinery at reduced rates and aid in building roads around their stations. The N. & W. is a great constructive force for good.

A New Asphalt and Oil Distributor.

A new appliance for distributing hot asphalt and oil, which has recently been put on the market, is advertised in this issue of Southern Good Roads. It is operated by one man, and is designed to replace the several laborers employed in hand pouring in the usual construction of bitumen bound broken stone roads by the penetration method.

The machine consists, essentially, of a covered tank fitted with a strainer and distributing mechanism and mounted on a pair of wheels. The tank has a capacity of 40 gallons. The screen is made of No. 15 iron wire and is of 5 mesh. It fits into



Gravel Road, Statesboro, Ga.

the tank at the top and may be removed for cleaning. When the tank is being filled the material is poured or discharged into the screen in order to keep foreign matter from entering the distributor. The wheels are 30 inches high and 3 inches wide. Two hinged lids cover the tank when in operation.

After the tank has been filled at the heater, the operator wheels it to the point at which the application is to begin. When he reaches this point he opens the outlet by means of the levers at the handles and walks along the road, drawing the distributor after him. The material is discharged from a slot at the bottom of the V-shaped projection at the rear of the tank. The width of this slot can be adjusted so as to permit the material to fall upon the road in a sheet of the desired thickness, thereby regulating the rate of application.

The distributor applies the material over a width of 2 ft. which brings the edges of the strip on which ap-

pllication has been made outside of the wheels.

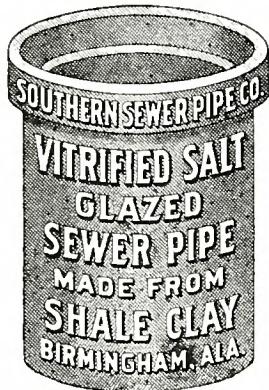
One of the advantages over hand pouring that is claimed for this machine, is that a more uniform distribution of the materials can be secured and that it effects a considerable reduction in the cost of labor as it not only makes possible the use of a smaller force but can be operated by unskilled labor.

The distributor is known as the "Eldus," and is handled by Henry J. McCoy, of New York City—Manufacturer of Asphalt Kettles and Road Building Equipment.

W. S. FALLIS, WILSON, N. C.

Civil and Highway Engineer

Highway, Bridge and Sewer Construction. Street Paving and Water Works



Double Strength Culvert Pipe

Vitrified pipe is impervious to moisture, and is everlasting. Write us for literature and prices.

We also manufacture farm drain tile, flue linings, wall coping and other clay products.

Southern Sewer Pipe Co.

Manufacturers

Birmingham, Alabama



IMPROVED SIMPLEX RUSSELL REVERSIBLE Road Machine

All steel. Not a toy, but built for business.

Works like a sulky plow—operated by one man

Arched Frame—No Clogging, four flanged wheels—No Skidding. The only two-horse machine strong enough for four horses in heavy grading. Weight 800 pounds. Not expensive. Full size polished blade 7 feet 2 inches. We make a full line of Road Bld'g Machinery

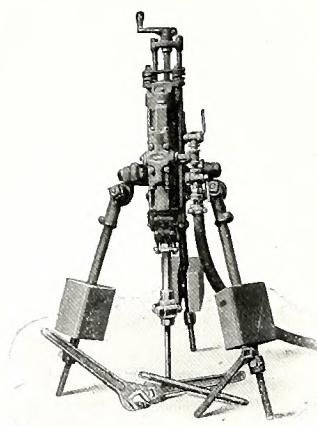
Agents Wanted. Write for Price Delivered
Sold on Free Trial

RUSSELL GRADER MFG. CO.
2230 University Ave. S. E. Minneapolis, Minn.

TENTS
Convict Clothing and Camp Supplies
TARPAULINS
MULE FLYS
WATER PROOFED

Everything of service in the Camping Line. "Quality of material, unexcelled workmanship---then the lowest price consistent therewith" our motto.

M. D. & H. L. SMITH CO., Dalton, Ga.



WOOD ROCK DRILLS

Makers of the Rock Drill that can be "cleaned up with a sledge hammer" and "wiped off with a scoop-shovel" and yet "stay with you."

SOLD BY

E. F. CRAVEN

GREENSBORO, N. C.

Good Roads Buttons

7-8 inch in diameter, solid blue ground with words "GOOD ROADS" in white. We try to keep a supply on hand at all times and can ship promptly.



Prices Cash With Order

250.....	\$ 5.50
500.....	8.50
1,000.....	12.50

F. O. B. Richmond

POWERS & CAPERTON

Box 628

RICHMOND, VIRGINIA

Make Your Work Pay Better

The 20th Century Grader takes the place of twenty shovels, does the work better and cheaper, fills every need in road making. This wonderful little steel grader, with ONE MAN AND TWO HORSES, does the same work as the big ton grader IN HALF THE TIME—and does it EASIER.

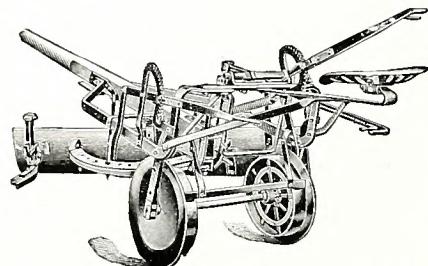
The 20th Century weighs only 600 pounds, built of steel, will stand the strain of hard service for years, every part made to stand its proportionate strain. EVERY OUNCE OF POWER GOES against the soil. The

20th Century Grader

Is the most serviceable machine of the kind—grades and crowns roads, spreads gravel and broken stone, maintains gravel and dirt roads, cuts and cleans ditches, moves dirt and drops it wherever you want it.

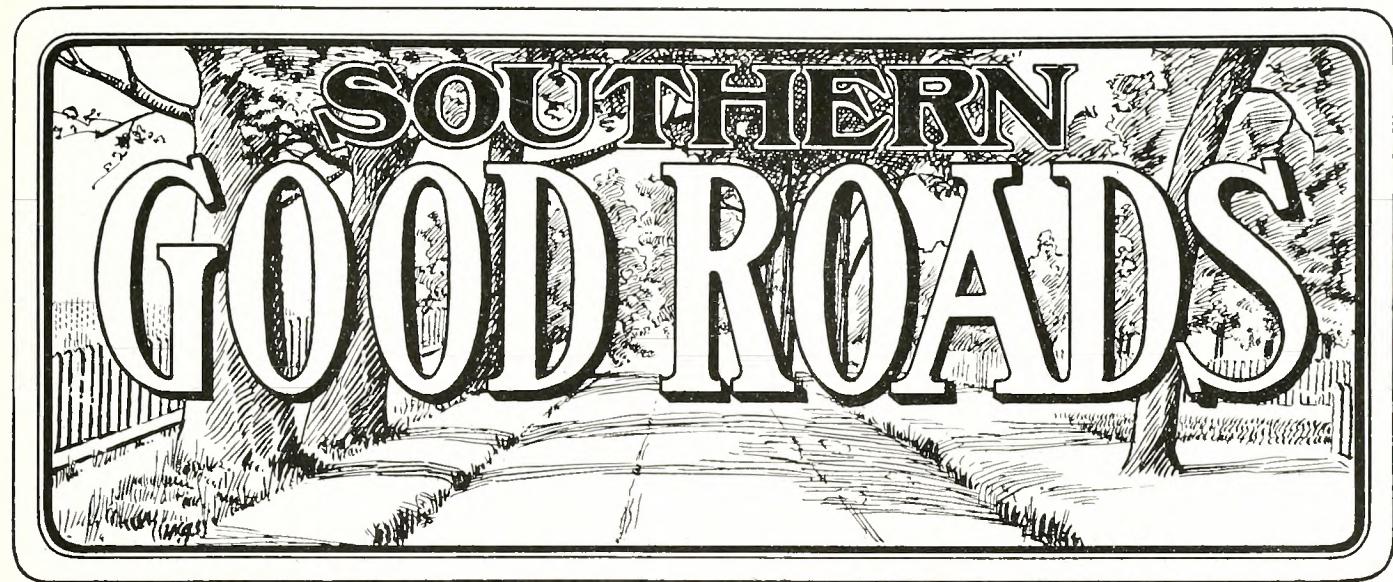
You ought to learn all about this remarkable machine from our free illustrated catalog. Read of the results thousands of practical men have obtained with it.

Write
Postal
Now



BAKER MANUFACTURING CO.

578 Hunter Building, Chicago, Ill.



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Lexington, N. C., October, 1911

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The Farmer and the Public Road

By DR. JOSEPH HYDE PRATT, State Geologist

It is worth while for all intelligent people to have some general idea concerning the simpler facts involved in the art and science of road building and maintenance. This is a matter which should appeal particularly to the farmer, for to him more than to anyone else the well built and maintained road means a saving of time and money in marketing his products, and makes easier the attendance of his children at school and his family at religious services, and increases the social intercourse which is needed to make farm life what it should be. All highways are intended to afford a hard, smooth and, as nearly as possible, a horizontal surface, over which the great instrument of civilization, the wheel, with his burden, can be made to move with the least possible friction. Every unit of friction encountered is a measurable element of cost either in time, power, or damage to the road and carriage. For every foot of distance he traverses the wagoner is incurring a tax. The amount of the tax over a properly constructed and maintained road may be as low as five cents per mile, but this increases with increase in grade or the condition in which the road is found. Because this tax is not paid out in actual cash to the sheriff, the farmer does not realize that it is coming out of his pocket all the time, but if he will think a moment he will realize that it is an infinitely higher rate of tax than any direct tax which he may be called upon to pay to keep the wheels of civilization going. Figures compiled by the United States Office of Public Roads show that the cost of carrying one ton one mile on the country roads of the United States, good and bad, average from 19 to 27 cents, while for the bad roads alone, and in the south the greater proportion are bad roads, the average is something over 30 cents per ton per mile. This means that every load of wood hauled from a farm, say, 5 miles from a town costs \$1.25 more in transportation than it should cost; or a farmer would realize \$1.25 a load more on his wood if the road were well constructed and maintain-

ed than he now gets over a poor road. If he hauls two loads a day he loses \$2.50 on his day's work because of the road; then if he hauls ten days he loses \$22.50, which is infinitely more than he would have to pay per year for his proportionate part of a bond issue to build the roads or of a tax to maintain them.

The cash value of a good road has been summarized under the following headings:

1. A reduction in the cost of hauling.
2. An increase in the value of lands, within its zone of influence.
3. Increase in productive value, through making unenltilized lands accessible.
4. The substitution of the more profitable crops for the less profitable crops.

5. The ability of the producer to market his produce at a time when the prices are more favorable instead of marketing his produce when the roads permit.

Realizing now what bad roads are costing the farmer and what good roads will mean to him, the question is how can good roads (and by good roads is meant a road which is good 365 days in the year) be obtained and maintained, for it is just as necessary to maintain a road after it is built as it is to construct it in the first instance. The farmer has got to pay his proportional part of the cost of the construction of the public roads, whether they are good or bad, and it is to his advantage to take an interest in the public road problem, and insist that every dollar that is raised for road work is wisely and economically expended. Many counties and townships have awakened to the necessity for building roads and have voted bond issues or special taxes for financing their project, but their money has been spent by officials who have had no experience in road building and the result has been that the county or township has a few miles of poorly constructed road and a good sized debt to pay off. Because of this tendency on the part of the officials who have charge of the expenditure of the public money to

build the road themselves without the services of a road engineer, the people have grown more or less chary of voting bonds, feeling that the money would not be well spent.

It is now the consensus of opinion among men who have spent their lives studying road problems that the only sensible plan for any county or township to adopt is to set apart a portion of their money for the employment of a competent road engineer to properly locate their roads and supervise their construction and maintenance. In order, however, to have a uniform method of road construction from one county to another, it is believed that the wisest policy would be for the state to have some kind of supervision over the road work of the counties and for the state to aid the counties, certainly to the extent of furnishing highway engineers for the proper location of roads. Under the present system of working the roads it is not a rash statement to say that at least one-tenth to one-fifth of the time and labor expended in the southern states in public road work is absolutely wasted.

Now, in order to systematize the highway work of the state, the establishment of a State Highway Department is strongly recommended, and if this department were established by the legislature it would mean that the building and maintenance of good roads would be put on a systematic and scientific basis; that the roads would be surveyed with an eye to their proper location and not to appease individual interests; and that they would be built under the supervision of an engineer of training and experience. The benefits the individual county or township would reap from such an arrangement are:

1. Great saving in the expenditure of the money derived from a bond issue or special tax. Under the present system a large proportion of the county's funds is

paid for experience—and the usual result is a good deal of experience but very poor roads.

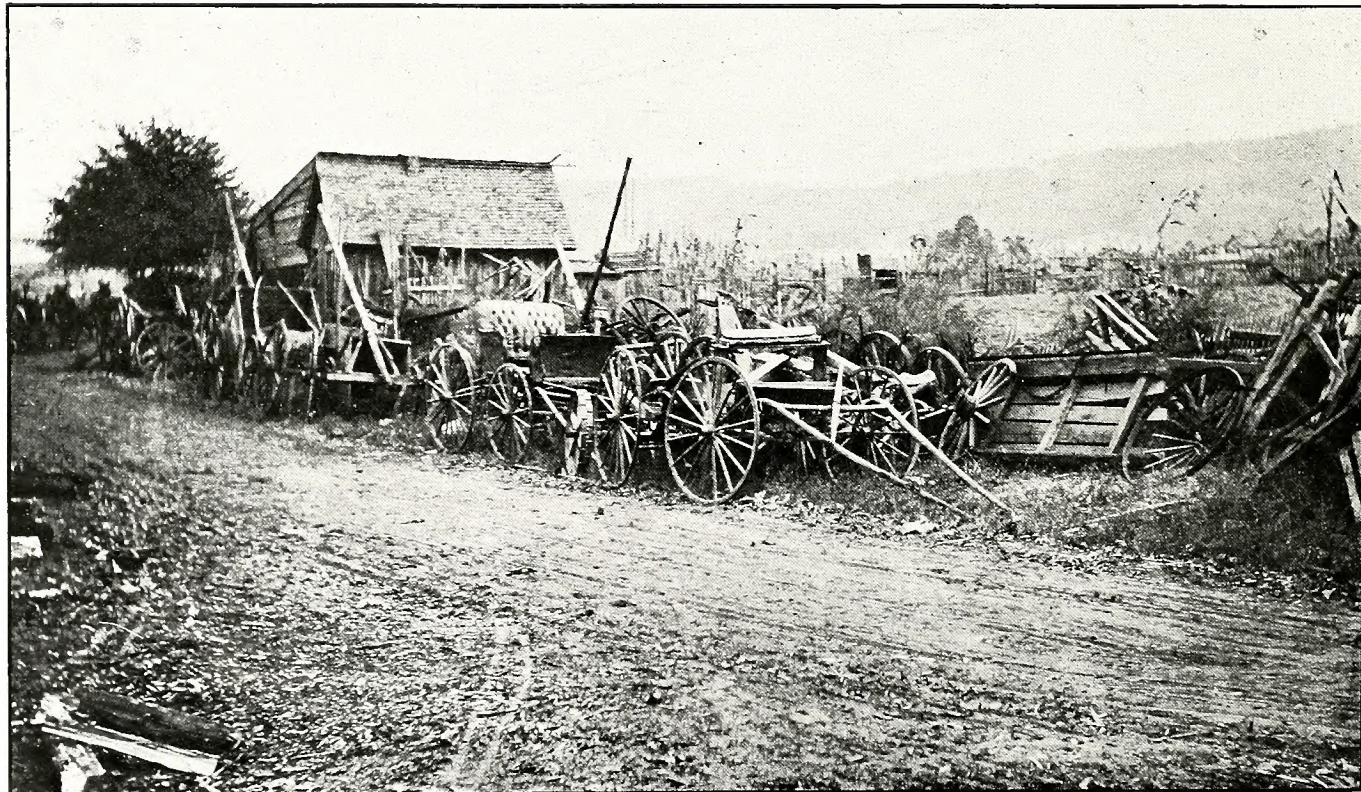
2. Roads properly located, irrespective of personal interests or polities.

3. Roads constructed out of the best and most economical materials available for each county. Only a skilled engineer, of wide experience, is capable of judging as to the proper materials for the construction of good, permanent roads.

4. The advantage of the most up-to-date knowledge in road building, as such a department will keep in touch with all modern methods of road building, bridge building, etc., and conduct experiments of its own to ascertain whether such methods can be used economically and effectively in the different sections of North Carolina.

For establishing this Highway Department and maintaining it effectively, a tax of one-fourth of a mill on every dollar of taxable property in the state is meagre in comparison with the tax levied by other states for such improvements; in comparison with the increase in the property value that will result from the work of such a department; and is exceedingly meagre when compared with the enormous levy of the mud tax, the human tax, and the vehicle and horse tax annually paid by the farmers of the state to bad roads, amounting last year to approximately eleven million dollars (\$11,000,000) in many of the southern states.

When the farmer, as a class, realizes the vital necessity for inaugurating some uniform system of road building and construction, he will demand of his representative in the state legislature that some attention be given to this problem which affects the welfare of every farmer in the state; he will demand of his representatives that instead of spending all the session of the legislature on petty details affecting some local



Location Anniston, Alabama. The farmers' tribute—sacred to the memory of bad roads. Forty-seven vehicles waiting for repairs; view only shows one-fourth of them

interest that some attention and thought be given to this matter of state-wide importance, which means so much for the future prosperity of the state; for, unless the state, as a whole, takes a decided step in this work of highway construction, she will be left far behind by other states, who are making large appropriations for the construction and maintenance of their roads.

Having shown the enormous tax of bad roads, the infinite advantage of good roads and what experience has shown to be the best methods for obtaining good roads, I would now like to give a few words of advice to the farmer as to what he himself can do toward improving the dirt roads, which still predominate so conspicuously in most states. It will be a great many years and perhaps generations before all or even half the public roads can be surfaced with macadam or sand-clay. It is, therefore, very important that we should give careful consideration to bringing the dirt road up to its highest efficiency.

When properly constructed, the dirt road can be kept in good condition throughout nearly the whole year, except perhaps during periods of severe freezes and thaws. The old idea that anyone could construct a dirt road is fast losing ground, and now it is realized that as careful thought should be given to the construction of dirt roads as is given to the hard-surfaced road; and in those counties which rely entirely on the labor tax for the construction of their public roads a great advance can be made if this labor tax is utilized under the supervision of an experienced road engineer.

The location of any public road is the only permanent portion of the road; therefore great care should be taken to have it properly located before construction is begun. An easy grade should be secured—none over 4 1-3 per cent—and it should be constructed so as to readily shed the rainfall. If in grading a road we have grades over 4 1-3 per cent, it will be necessary to construct across the surface of the road a V-shaped surface ditch to turn the water off the surface of the road, for if this is not done the water will with a grade over 4 1-3 per cent have momentum enough to seriously gully the surface of the road. It is wise, however, to avoid as many of these V-shaped ditches as possible, as they are inconvenient to travel and are hard on the wagons, and they can be avoided if the grade is kept below 4 1-3 per cent. The dirt road is more susceptible to damage from water than any of the specially surfaced roads; therefore, great care should be taken to work out an efficient system of drainage for the road. Water should be kept away from the road and the rain which falls on the road must be permitted to run off as rapidly as possible and by a very easy grade. It must not only be taken off the surface as rapidly as possible, but also out of the side ditches. Care should be taken that these side ditches are not too steep and that every opportunity is seized for turning the water out of the ditches into the adjoining fields. After a system of drainage has been installed, provision should be made to keep it up so that the drains and culverts will not become stopped up.

The surface of a dirt road should be kept of dirt and whenever any holes or ruts have developed in the road they should not be filled up with stone or brush, but with dirt, and with dirt as nearly as possible of the same character as that of the balance of the road. After the road has been well-constructed and the right slope and surface obtained, it can be kept in this condition very

readily by a judicious application of the split-log or King drag. This simple road machine, if used regularly after a rain when the road is wet, will smooth and shape up a road so that when it is dried out it will be firm and hard. The drag will fill up the holes and ruts and will keep the road in first-class condition, with a hard surface, throughout nearly the whole year.

As moisture is very detrimental to a dirt road, the sun should be permitted to strike the surface of such a road as much as possible, and, therefore, care should be taken not to have too much shade along a dirt road, and, where necessary, the trees should be cut away so that the whole surface of the road is exposed to the sun for at least several hours during the day. This does not mean that all trees should be cut from alongside a dirt road and thus destroy the beauty of the highway, but it does mean that all trees should be cut so that the road surface will be exposed to the sun for a part of the day.

In repairing a dirt road the same thought must be given as in its construction, and when cleaning out ditches, material should not be thrown in the middle of the road or on any part of the surface of the road, but it should be thrown into the adjoining fields, for such material is usually composed largely of fine silt and vegetable material, which holds moisture like a sponge and becomes very difficult to dry out, and is entirely different in character and consistence from the dirt surface of the road.

In the maintenance of our dirt roads, they should be divided into sections with a foreman or overseer in charge of each section, whose duty it should be to go over every mile of his section after every rain and at least every two to four weeks, and wherever he finds a portion of the road needing repairs he should have it done. After each heavy rain he should run a road drag over the road in order to bring it back into shape and fill up any ruts or holes that might have been started. Farmers living on the different roads can best act as overseers of sections and while they may not make very much money out of the job it will mean that their roads will be kept up in good condition.

Our farmers are thoughtlessly increasing the cost of maintenance of many of our public roads by using them as turning places in plowing, harrowing, or cultivating their fields adjacent to the roads. By doing this they are constantly bringing into the road a small amount of soil which gradually but surely fills up the road ditches and causes the road to become washed. This use of the public road should be stopped and when those who now use the road for this purpose are shown the bad effect it has, they will undoubtedly give it up for they know how valuable a good road is to them.

Another use that is being made of the public roads by some of our farmers is to use the ditch of the road as a drain ditch for the farm, the land being plowed so that the furrows drain into the road. This is bad in two ways, one because it brings into the road ditch an excessive amount of water which often causes it to overflow and wash the surface of the road and also washes a great deal of silt and dirt onto the surface of the road, which in a number of instances have completely buried and destroyed stretches of macadam road. In the second place the farmer is losing some of the most fertile and valuable part of his land in the material that is washed into the road. Considerable of his fertilizer also goes into the road ditch and is lost. All of this material should be deposited on the farm

itself and can readily be carried to the low part of the farm. This use of the public road is a very serious one and should be prohibited in every case.

A good public road is one of the greatest assets a farm can have and the farmer should take advantage

of every opportunity that comes to him for obtaining better roads; and he should be not only willing but eager to do his part toward maintaining the public road.

Features of Second Annual Convention of the American Association For Highway Improvement

With the establishment of the American Association for Highway Improvement in which some of the most prominent officials and railroad men are identified, Washington has become a pivotal point in the great movement for the building and improving of public roads all over the country.

The fact that more than \$1,000,000 a day is being spent throughout the country for the building of new roads and the improvement of old roads and the additional fact that more than 15,000 miles of new highways linking all corners of the United States are contemplated shows the great hold that the good roads movement has taken upon the United States and considerable credit for present general interest in the movement is due to the American Association for Highway Improvement which was fostered largely by Washington men.

The American Association for Highway Improvement was organized in Washington, November 22, 1910 with the announced purpose of correlating and harmonizing the efforts of all existing organizations working for road improvement. Logan Waller Page, Director of the U. S. Office of Public Roads was elected President; W. C. Brown, president of the New York Central Lines, was elected vice-president; Lee McCiung, Treasurer of the United States, was elected treasurer; and Louis Hill, president of the Great Northern Railroad Company, was elected chairman of the Board of Directors. Among the directors are B. F. Yoakum, chairman of the Frisco Lines; Dr. E. J. James, president of the University of Illinois; J. Hampton Moore, Congressman from Pennsylvania; John A. Stewart, president of the International League for Highway Improvement; and James S. Harlan, Interstate Commerce Commission.

The association is not designed to supplant any existing meritorious organizations or in any way interfere with their policies or activity. Its purpose was stated to be helpful towards each organization and to bring to the aid of each the full strength of all organizations working towards the common end.

Provision was made for affiliation by existing organizations and among those that have already become members in the Washington Association are the following: Ohio Good Roads Federation, Good Roads Club of Georgia, North Carolina Good Roads Association, South Carolina Good Roads Association, Arkansas Good Roads and Drainage Association, Capital Highway Association, Central Highway Association, Iowa Good Roads Association, Indiana Good Roads Association, International Good Roads Association, Touring Club of America, Omaha-Denver Good Roads Assoca-

iation, Inter-Mountain Good Roads Association, North Dakota Good Roads Association, Oregon Association for Highway Improvement, Memphis-to-Bristol Highway Association, Gulf Coast Good Roads Association Aroostook County Good Roads Association of Maine, Southern Appalachian Good Roads Association, South-eastern Kentucky Good Roads Association, Montana Society of Engineers.

Believing that no single movement before the country today promises such big returns on the money invested, President Taft has joined the association as a regular member and recently informed the officers of it that he will make an address upon improvement and maintenance of the public roads at the First Annual Convention of the Association and the Congress of its allied organizations to be held at Richmond, November 20 to 23rd. The president will speak on the opening day of the convention Monday, November 20.

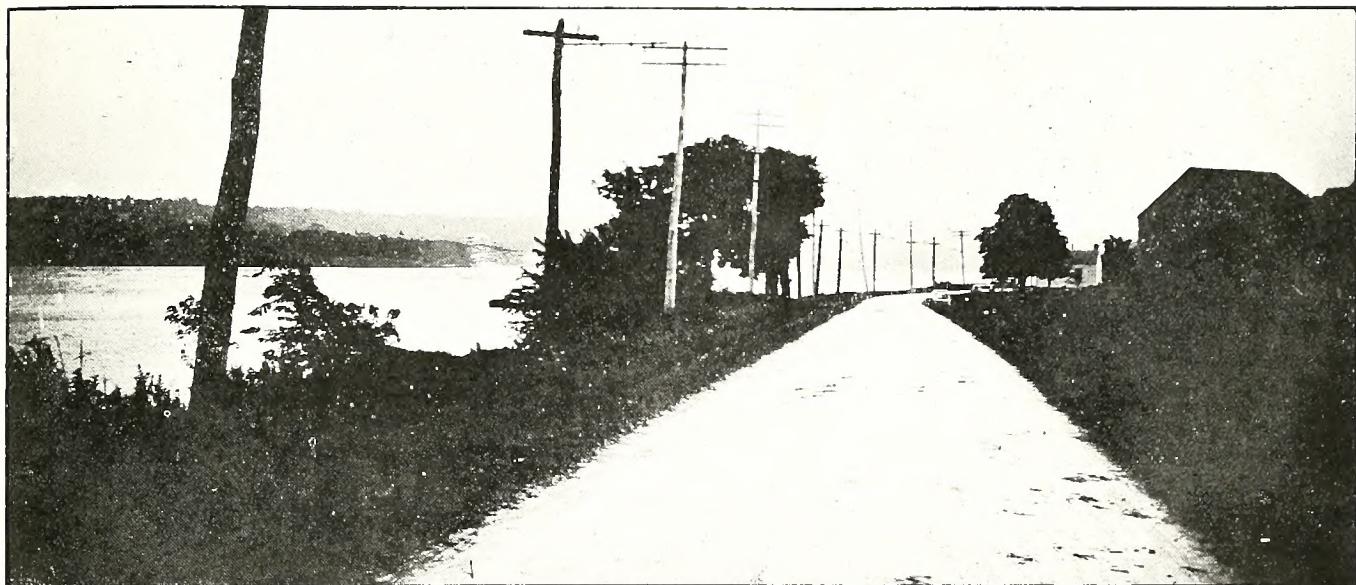
President Taft has repeatedly made it plain that he is heartily in favor of the good roads movement that is spreading over the United States and that he is willing to do all in his power to further it. He is particularly enthusiastic over the work of correlation and co-ordination that is being done by the American Association for Highway Improvement and has accepted a regular membership in that organization.

In order to fit in with the engagements of the president, the date of the convention was changed from October to November 20 to 24 and now that the president has definitely informed the officers of the association that he will speak on the opening day the success of the convention is assured.

All the road associations in the United States and Canada, which are affiliated with the American Association for Highway Improvement, will take part in the convention that is to be held in Richmond and automobile tours are being arranged under the direction of the Touring Club of America, which is also an associate member of the American Association.

Gen. T. Coleman Du Pont, who is financing a \$2,000,000 boulevard across the state of Delaware, has accepted an invitation to be one of the speakers. Congressman J. Hampton Moore, of Pennsylvania, who previously has been mainly identified with the improvement of the waterways of the country, has been elected a director of the American Association for Highway Improvement and will devote considerably of his time to the cause of improving the public roads of the country. He will be one of the speakers at the Richmond convention.

Logan Waller Page, director of the government Office of Public Roads, will make an address, as will also



Macadam Road Near Albany, New York

Senator Swanson, of Virginia. Senator Martin, of Virginia, minority leader of the senate will likewise make an address. Other men of national prominence who have consented to address the gathering are Dr. Walter Page, editor publicist; W. W. Finley, president, Southern Railway Company; B. F. Yoakum, chairman of the Frisco Lines; W. C. Brown, president of the New York Central Lines; Harold Parker, chairman of the Massachusetts State Highway Commission, and most of the leading highway engineers of the country.

Probably the greatest tribute that has been paid the American Association is its designation to be the correspondent of the Permanent Association of Road Congresses, in which thirty-five nations are officially represented. In a letter just received by J. E. Pennybacker, Jr., Executive Secretary of the American Association, the president of the International Association, who is also Inspector of the superb road system of France says:

"We propose to consider your association as our correspondent in the United States and to depend on it to harmonize the studies which it has undertaken with those which are proceeding in the different countries represented in the Permanent International Association."

"Thanks to the high patronage of the president of the United States," says the letter, which is dated from the headquarters of the International Association at 1 Avenue d'Iena, Paris, "and to the influence of the members of the Bureau of Directors and important personages who have taken the initiative in the creation of your association, it seems to us that your association must certainly have a great development rapidly and that it will succeed in order to combine their efforts in grouping the numerous associations which have been or may be created in the different states of the union. We have also learned with pleasure that your association proposes to do all that will be in its power to obtain the official association of the government of the United States in the Permanent International Association of Road Congresses."

The letter calls attention to the fact that the United States is the one great power that is not officially represented in the international association to which other nations have designated representatives through diplomatic channels. The International Association was

formed for the purpose of international co-operation and exchange of thought and experience in road building and the greatest engineers and scientists of the world have attended the great road congresses that have already been held. The first congress was held in 1908 at Paris; the second in 1910 at Brussels, and the third is to be held in 1913 at London.

Now that the American Association for Highway Improvement has been officially designated by the International Association as the representative of the United States and American correspondent, Secretary Pennybacker, announces that the American Association will make an effort to bring the next international congress to America. After the convention at London in 1913, two years will probably elapse before the next congress and this will give the officials of the American Association plenty of time to agitate the question. They will make their plea for the next congress when they attend the one that is to be held in London.

"I am particularly gratified," said Mr. Pennybacker, "that our association has been named as the American correspondent of the International Association. The president of our association, Mr. Logan Waller Page, who is the director of the Office of Public Roads, was named by President Roosevelt as chairman of the Commission to the Paris Congress, and inasmuch as we are trying to do for the United States what the international association is trying to do for the world we feel that the arrangement entered into will prove mutually satisfactory."

"France, of course, has the greatest system of public roads in the world, built at a cost of \$613,000,000 and now practically completed. The most striking feature of the French system is the thorough and continuous maintenance by a force of 50,000 patrolmen who devote their entire time to the care of the roads. America is derelict in road maintenance but leads the world in the development of labor saving equipment and methods and so we feel that while their experience and knowledge will be valuable to us ours will be equally valuable to them."

The manner in which the association has been received throughout the United States is due largely to the energy of its president, Mr. Logan Waller Page and its Executive Secretary, Mr. Pennybacker. Mr.

Page's activity in the road movement as head of the United States Office of Public Roads has ideally fitted him to be president of the new association. Mr. Pennybacker was formerly chief of the division of Road Management of the Government Office of Public Roads and his work with the government gave him a training which is proving invaluable to the association of which he is now secretary.

Mr. Pennybacker in the course of his work in pushing the good roads propaganda has appeared before legislatures and legislative conventions. He has drawn many road bills and given advice to legislators in many states, including Arkansas, North Carolina, South Carolina, Alabama, Tennessee, Indiana, North Dakota and Oregon. He has been particularly active lately in organizing new associations which have become members of the central body in Washington and in making addresses to county associations, especially in West Virginia, Maine, Tennessee, Virginia, Indiana, and Maryland.

The manner in which the newspapers have taken up the work of the American Association for Highway Improvement indicates that there was a general realization of a need of some such clearing house for the activities of the good roads boomers. Hundreds of papers all over the country have given space to the manner in which the road movement is progressing, and have served to educate the public to the fact that money invested in public roads is certain to pay interest and compound interest.

In the campaign being conducted by the association from its headquarters in the Colorado Building it is being shown that the improvement of 20 per cent of the roads of the United States would bring the maximum of efficiency. Figures compiled by the officials of the association show that an expenditure of little over \$3,000,000 in each state would result in a general saving to the country of something in the neighborhood of a billion dollars a year in the prevention of wear and tear on vehicles of all sorts, the increased life of horses and mules and increased economy in the transportation of crops. It is being shown that while the farmer would be the first to obtain the interest on the investment all other business and industries would soon be benefitted.

The manner in which the railroads have given their support to the association is one of the best indications that shrewd business men realize the great commercial importance of improved highways that will enable farmers to transport their crops quickly and cheaply in all seasons of the year. The railroad men feel that they will be benefitted by the establishment of uniform hauling conditions throughout the country. Good roads will do away with the empty freight cars which are now such a source of loss to the railroads in the rainy or muddy seasons of the year when farmers can't get their products to shipping points. The value to the farmers, of course, is obvious.

At the Richmond convention where all the allied organizations of the American Association, automobile tourists, manufacturers of road materials and machinery, and public highway officials from all over the country, will be present it is expected that there will be such an interchange of ideas as will lead to a system of public roads that will be the equal of those in France. From the standpoint of Washington one of the most interesting features will be the agitation of interest in the Quebec-Miami road which is now in a fair way of being completed. New York has appropriated \$1,500,000 to finish the road now under way from

New York City to the Canadian Line. The Provincial government has raised money to finish it to Montreal. Money is now being raised to carry the road to Quebec.

From New York to Philadelphia and from Philadelphia to Baltimore the continuation of the proposed roads is already in excellent shape with the exception of twelve miles between Perryville and Elkton which can be avoided by detour. Money has been appropriated to finish the road between Baltimore and Washington while the contract has been let for the improvement of the road from Washington to Fairfax court house, the road being eighteen miles in length.

The Capital Highway Association of which Leonard Tufts is president, has reported that most of the roads from Richmond to Florida are in fine condition so that the only important gap left is from Fairfax to Richmond. A fine road to Richmond would be a boon to both cities and great interest is being shown in the proposal of the Chamber of Commerce of Washington to have the \$2,000,000 appropriated for a Lincoln Memorial used in building a great national highway linking the capital of the United States and the former capital of the confederacy. It is believed that the tours which are being arranged by the Touring Club of America to the Richmond Convention will be helpful to this end and will serve to call attention to the project for the completion of the great highway from Quebec to Miami. Interest has also been aroused in the proposal of Robert N. Harper of the Chamber of Commerce to build a road from Washington to Leesburg, Virginia.

The United States Office of Public Roads will be well represented at the Richmond Convention and director Page will probably outline at that time the results that are expected from the experimental road now being constructed at Chevy Chase. The Chevy Chase road, which extends more than a mile from the circle in the direction of Bradley Lane, will be made of the various types of road materials and automobile drivers are much interested in the tests as to which of the various types will prove the most appropriate to automobile traffic.

One of the interesting features of the convention and congress at Richmond will be the assembling of various good road trains which have been travelling on the lines of the Southern Railway Company, the Atlantic Coast Line, the M. K. & T. R. R., the Frisco Lines, and the N. C. & St. L. All of these trains will be open to visitors on the side tracks at Richmond. There will also be a number of moving pictures showing comparisons between good roads and bad and the varying defects.

Houston, Tex., will build a boulevard three miles long.

Elk City, Okla., will build several fine streets at a cost of \$12,000.

Hamlin, Tex., will construct eight blocks of macadam paving and five of wood block, or bitulithic.

Tazewell county, Va., has rejected bids for 35 miles of macadam road and will ask for new bids at once.

Coffee county, Ala., has voted bonds for \$100,000 to build good roads.

Greenbrier district, Summers county, W. Va., has voted a bond issue of \$500,000 for road-building.

Memphis, Tenn., is preparing to spend \$50,000 on streets and contracts for the larger part of the work have been awarded.

Graduate Course in Highway Engineering at Columbia University

By PROF. ARTHUR H. BLANCHARD, M. Am. Soc. C. E. Professor of Highway Engineering, Columbia University, New York City

The status of highway engineering in the United States was ably presented before the society for the Promotion of Engineering Education at the New York meeting in 1909 by the Hon. Logan Waller Page, Director of the United States Office of Public Roads. As stated by Mr. Page, many years will elapse before the supply of thoroughly trained highway engineers will exceed the demand. The conditions existing in 1909 have not been materially improved during the past two years.

The technical graduate who is attracted to highway engineering has several more or less well defined fields open to him: namely, the highway departments of municipalities and towns; those of states, counties and companies dealing in materials and machinery used in highway work. In city and town work matters relative to the construction and maintenance of streets and pavements compose the bulk of the work assigned to the highway departments together with more or less road engineering problems. With state, county and park departments, the construction and maintenance of all types of road surfaces and bituminous pavements constitutes ninety per cent of the work of such organizations while certain problems in street pavements and highway bridges have to be dealt with occasionally. The prevailing idea, however, that the two fields just mentioned are easily separable and that the preparation for one should not be the preparation for the other is essentially wrong. Since the lines of demarcation between the above fields are rapidly becoming obliterated the successful highway engineer of today, whether engaged by the city or state, must have a comprehensive knowledge of all branches of highway engineering and allied subjects. Otherwise it is obvious that it will be impossible to follow that important principle of economics of highway engineering, the adaptation of methods and materials to local conditions.

In contemplation of these opportunities, the essential pre-requisites of a successful career as a highway engineer must be given due consideration in order that the future prospects offered by this field of engineering may be thoroughly understood.

The ideal foundation consists, first, of four years training in a course in civil engineering, second, practical experience in both field and office in connection with the construction and maintenance of roads and pavements on a system of highways, and, third, the acquisition of knowledge along certain lines of particular value to the highway engineer.

In explanation of the last prerequisite it might be stated that to be well informed the highway engineer must acquire considerable knowledge relative to the economics of highway engineering, materials of highway engineering, management engineering, highway laws and systems of administration, mechanical appliances used in highway engineering, highway bridges and culverts, road and street surveying, drafting and designing, methods used in a road material laboratory, advanced dynamic and structural geology, lithology, petrology and petrography, processes of industrial chemistry, methods of testing bituminous materials and the

interpretation of results, and finally advanced highway engineering covering the most recent practice throughout the world in the construction and maintenance of all kinds of roads and pavements.

The fulfillment of prerequisites numbers one and two is easily accomplished except that the graduate of one or two years standing may with difficulty retain his position during the month from December to March inclusive especially if he is connected with a state or county department or the organization of a contractor. In these fields of highway engineering the immense amount of work to be completed during the construction season in the north requires the maximum engineering force obtainable both in the field and in the office, while during the four months mentioned above, the natural confinement of a large percentage of the work to the office necessitates reducing the engineering staff. The prospect of being without work for four months of the year has prevented many high grade technical graduates from entering the field of highway engineering. In certain cases it has been possible by co-operation between state highway departments and colleges giving courses in civil engineering to mitigate the evils of this situation. As a concrete example may be cited the writer's experience while he was Deputy Engineer of the State Board of Public Roads of Rhode Island. Many of the best civil engineering students at Brown University were employed throughout the college year part time and during vacations all the time, year in and year out, with the natural result that upon graduation some became members of the permanent force. At all times, however, the office force consisted of trained men of a number commensurate with the work of a given season. It should be said that in many cases this plan will not work out satisfactorily for the field or inspection force, due primarily to the fact that while the construction season extends from April to November inclusive in certain sections of the country, the long vacations cover only June to September inclusive, hence the impracticability of utilizing undergraduates, resident at the University, in the months of April, May, October and November in the above field positions.

The third prerequisite mentioned might, of course, be covered by collateral reading but it is self evident that only a very limited idea of certain of the subjects mentioned can be acquired in this way. Especially is this statement applicable to over fifty per cent of the subjects which, it is apparent, must be illustrated and exemplified by laboratory equipment and well stocked museums or developed through the medium of research library work. The United States Office of Public Roads, through the medium of its corps of civil engineering students, offers a method by which a limited number of men may receive training in the construction of roads and instruction in various subjects related to highway engineering. However, as Mr. Page stated in 1909, "this plan will provide but a small percentage of the engineers that will be required."

The problem before the educational institutions of this country is that of determining by what method the subjects outlined above can be offered upon a prac-

tical basis. The writer does not favor a four years undergraduate course in highway engineering, not only because of the varied and potent reasons which have been presented on various occasions with reference to specialized undergraduate courses but also because undergraduate students are not sufficiently mature to acquire the benefits which should be derived from a combination of practical experience and specialized knowledge.

The most practicable plan is to arrange a definite course of instruction as a unified graduate course based on the assumption that the technical graduates enrolled for the Master's Degree will hold undergraduate degrees in civil engineering. If the graduate instruction is to be given in the period from about December 1st to about April 1st it will be possible for practicing highway engineers, especially first, second, and third year graduates, to use the winter period advantageously in acquiring advanced knowledge under favorable circumstances.

It is gratifying to the highway engineering profession and that portion of the public interested in the development of good roads and streets throughout the United States that Columbia University should have decided to establish graduate courses in highway en-

Lectures by Highway Engineers, Chemists and Other Experts, Road Material Laboratory, Management Engineering, Street Surveying, Drafting and Designing.

As the special staff of instructors has been appointed and as the various laboratories required will be completely equipped in the near future all the advanced courses in highway engineering and allied subjects as outlined in the above schedule will be open to properly qualified persons next December.

It is of interest to note that this plan has the enthusiastic support of many of the foremost highway officials and engineers in the United States. All emphasize the feasibility of granting four months leave of absence to practically all the young civil engineers who wish to take graduate courses in highway engineering. It is the hope of those interested in the higher education of highway engineers in the United States that it will be possible in the near future to lay the foundation for the establishment of a corps of highway engineers comparable to that admirable body of trained men who have graduated from l'Ecole Nationale des Ponts et Chaussees of France.

The Texas Good Roads Congress.

The Texas Good Roads Congress is to be held in Dallas on the 26th of October. Many of the leading road experts of the nation will be in attendance and the best brains of the Lone Star State will be set to work to devise a comprehensive plan for supplying the state with good roads from one end of it to the other.

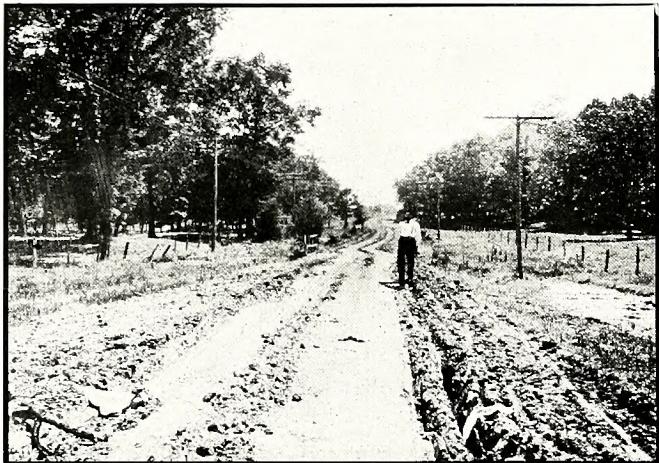
Governor Colquitt, who ranks as one of the most progressive chief executives of the south, is an ardent good roads advocate. He has issued a proclamation to the people of Texas in regard to the congress, which is, in part, as follows: "An adequate system of improved public roads is one of the great needs. Good roads lend a powerful aid to everything good in modern life, while bad roads form an obstacle in the path of progress. Recognizing this fact the people of Texas have taken hold of this problem with tremendous interest and it is now one of the foremost economic questions confronting our people.

"In the march of progress Texas is by no means the last. While following the principle of local self-government by allowing each county or each precinct to provide such road systems as its needs may demand and its ability will permit, Texas has today perhaps more and bigger road problems than any other state in the union.

"Gratifying as our progress has been there is still need for co-operation and unity of action which would be promoted by a regular state highway department, or by a state good roads association. As we must be without the former until the next legislature meets, it is the duty and privilege of the advocate of good roads to take such steps as may seem expedient to secure these ends.

"I have recently received letters urging me to call for the formation of a state good roads association.

"Now therefore, in conformity with my sense of duty in this matter and in compliance with the above request, I hereby issue this my proclamation calling for a state good roads convention to be held in the city of Dallas, on October 26, and call on each of the above named organizations to name delegates to attend the meeting. I further urge that all local and district good roads clubs send delegates to represent them, and that the general public, irrespective of any organization, join in making this movement a great success."



Bad Road, Fort Smith, Arkansas

gineering based upon a most comprehensive plan and the principles enunciated above.

The new graduate courses to be offered at Columbia will cover the field of subjects referred to previously in this paper and will in amount be sufficient to satisfy the requirements for the Master's Degree. As the period of attendance will be from December to March inclusive, equivalent to about one semester, two periods of residence will be required to fulfill the requirements for the degree.

The tentative arrangement of the graduate courses to be offered at Columbia University will be as follows:

First Year—Process of Industrial Chemistry, Dynamical and Structural Geology, Advanced Highway Engineering, Materials of Highway Engineering, Seminary in Current Highway Engineering Literature, Lectures by Highway Engineers, Chemists and Other Experts, Mechanical Appliances Used in Highway Engineering, Highway Bridges and Culverts, Road Surveying, Drafting and Designing. Second Year—Industrial Chemical Laboratory, Lithology, Petrology and Petrography, Advanced Highway Engineering, Highway Laws and Systems of Administration, Seminary in Current Highway Engineering Literature,

The Jackson Memorial Highway

By MISS ALMA RITTENBERRY, Chairman of the Jackson Highway Committee of the Alabama Daughters of 1812

It is fitting that the National Society of United States Daughters of 1812, state of Alabama, should erect as a monument to Andrew Jackson a transcontinental highway, reaching from the lakes on the north to Mobile and on to New Orleans, to follow Jackson's trails wherever practicable. Other patriotic societies have spent millions in erecting buildings to house relics and the like, boulders and monuments, but this Jackson highway is not only the most ambitious, but is the most useful memorial ever erected by a patriotic organization. It benefits the living, while honoring the dead. It is to be a broad road, as low in grade and direct in route as possible, built county to county, state to state, each toting its own skillet, down through this mighty empire between the "Blue Wall" and the Rocky mountains, which Jackson laid open to civilization by his conquest of the Indians. It will be a source of pleasure, financial and cultural gain not only to the descendants of Boone and Clark, who blazed the way into this region, but to those brothers of ours from across the seas, who hope to find in their adopted land the advantages they could not get in the old world. To properly make Americans of them, they must have all possible aid from us whose fathers came over so much sooner.

The route of this Jackson Highway abounds in history. The lakes—they too are enshrouded in legends of "The Beaten Track," the road around them made by the French Canadians in their explorations in the early part of the 18th century; Chicago, on Lake Michigan, where the white capped waves laden with commerce never tire of going to and fro to every land and clime, a city that is called the "Mixing Bowl" of the nation, and where the immigrant is well seasoned and is sent over the "Main Traveled Roads" to the wheat fields of the great northwest, or pressed into the ever increasing trade of the city. The highway will pass through the black loamy soil of eastern Illinois, and built on the states rights plan, it pays a tribute to one of the state's great sons, the famous Altgeld. It will go through Indiana over an historic road or trail trod by a Roger Clark or Henderson, "When Knighthood was in Flower," the home of Hendricks, and "The Gentleman from Indiana" and of James Whitcombe Riley, who used to pass by "That Old Swimming Hole" going "Ont to Aunt Mary's." It will go over the old Louisville and Nashville turnpike, famous in history and story, through Kentucky, "the dark and bloody ground," that gave birth to a Clay, a Lincoln and a Jefferson Davis. Had American history had but these three names, it would fill a glorious page. But Kentucky has given "My Old Kentucky Home," the "Kentucky Cardinal" and Proctor Knott. It will go on through Tennessee, by the Hermitage, where Andrew Jackson lived and died. The Hermitage and Jackson are associated terms, like Washington and Mount Vernon, man and his home, should be. It will pass through Nashville, beautiful for situation—it rises gracefully, above the bluffs of the river to be crowned with its capitol. The Cumberland river with its bluffs and promontories and variegated banks, sweep by it, while far and wide stretches delightful scenery. Almost in sight of the city and 12 miles away is the Hermitage and the grave of Jackson. James K. Polk, the 11th President of the United States, lies buried in the capitol grounds. Not in the city of the dead, but in

the city of the living, his form repose. These two presidents, adopted sons of Tennessee, warm personal friends in life, sleep almost together in death. The sights and sounds of life with which they were familiar are still about their place of rest. The generations rising up around them who look upon their tombs and read their histories may be quickened by them to add new honors to the country they served and which honored them with its highest confidence.

The Jackson Highway passes thence on down "The Pike of Battles" to Franklin. "There is death in every mile of this pike." It was a battleground of the confederacy, a turning point in its history. It was on this pike and the Mt. Pleasant pike, that runs also from Columbia through "the garden spot of the world," that Buell made up the hours that saved Grant's army at Pittsburg Landing that Sunday night on April 6, 1862, which made Grant a President instead of a prisoner and welded two sections into one glorious nation. On what little things do the destiny of men and nations seem to hang! "A pike of battles it is, and every mile a battleground. Here for four long days blue and gray charged and recharged, captured and recaptured—Van Dorn, Forrest, Wheeler, Hood, Wilson, Buell, Schofield, Thomas, marching and counter-marching on a long, white road of death. Here it was on that fatal November day ere night had dropped her curtain down, that Cleburne, Strahl, Granbury, Adams and Gist, that matchless quintette of brave generals, lay dead around the breastworks of Franklin, while thousands of the boys in gray who marched that day along this shaded avenue, and thousands of those in blue, who fell back before them, gave up their lives."

The Jackson Highway passes through Columbia, a gem set in the Blue Grass section, on down to Pulaski, the home of Sam Davis, "the boy hero of the nation." Pulaski, the noted in Ku Klux Klan history, thence over beautiful Elk river, the hunting ground of Davy Crockett. It passes through cultured Athens, crosses the Tennessee—the river of the Big Bend—to Decatur, which preserves the name of Stephen Decatur, to Cullman, where our brothers from over the sea found a new fatherland, and on to Birmingham, the "Magic City of the South," in the great county of Jefferson, named in honor of one whose name is inseparably linked with the greatness of our country's history.

The Board of Revenue of Jefferson county was the first to grant to the Daughters of 1812 "the right of way." It goes through the little town of Thorsby, peopled mostly by "gentlemen from Indiana," seeking a softer clime; through Montgomery, the "City of Memories," where the flag of the Confederacy was first flung to the breeze; through the county named in honor of Major Montgomery, the brave Virginian, who at the age of 28 yielded his life in defense of his country at the Battle of Horseshoe Bend. When the battle was ended Jackson stood over his body and wept. He exclaimed:

"I have lost the flower of my army!"

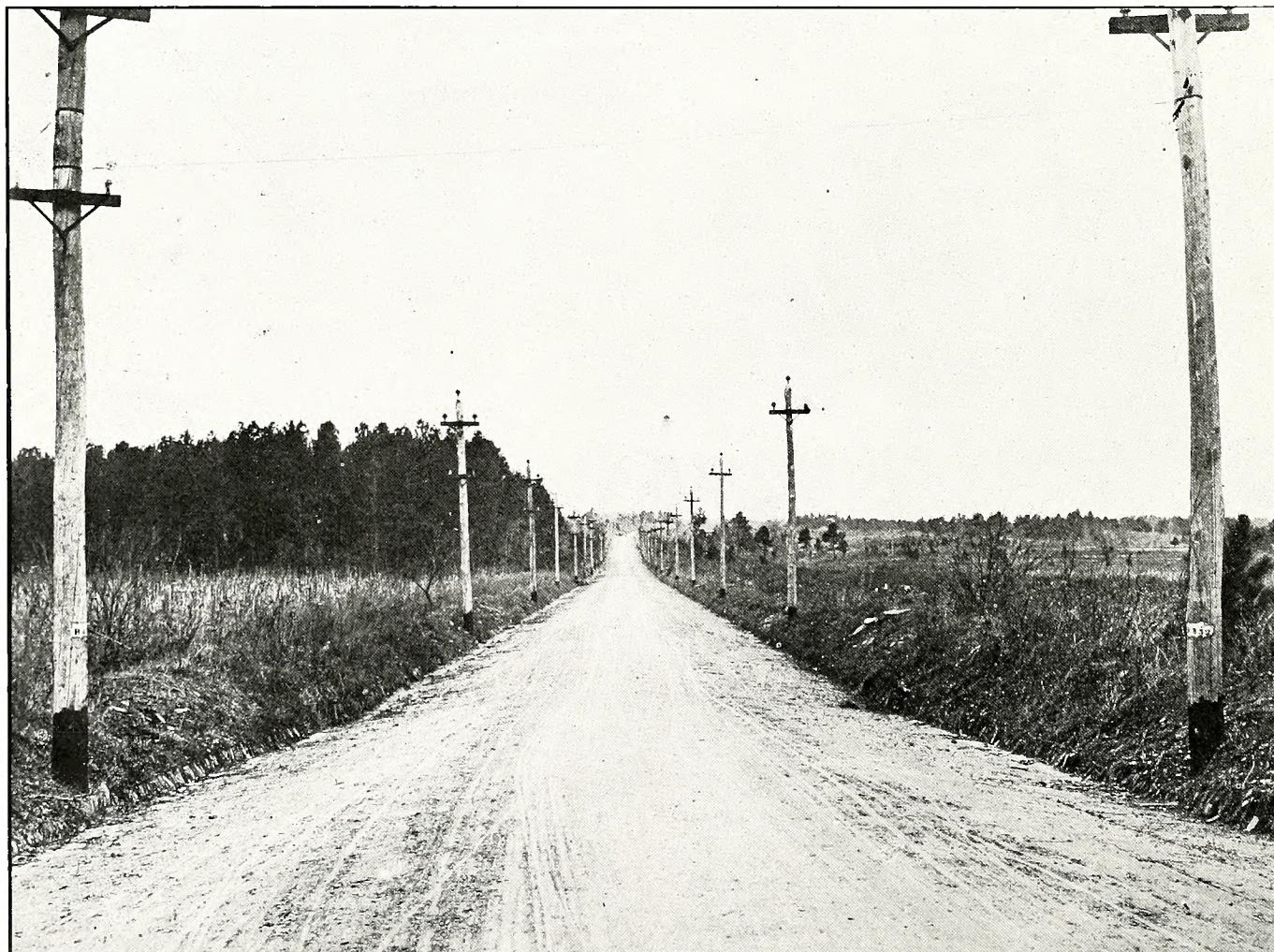
The memory of his relation, who fell at Quebec, is preserved in the name of the city. The highway will go on down, over sparkling streams, by cotton fields dotted with the cotton pickers—the negro—who in great number is still servant and tenant on the old plantations that first gave him a local habitation and

a name. The negro has, to say the least, a picturesque bearing in the New South and is a romance and a poem on the Old South that will assert itself in history as did the "Border Tales" of Scotland and the "King Arthur Legends" of England. With all his faults he is the remnant recollection of the south's palmiest days of prosperity and of her darkest days of adversity. Through magnificent forests of oak and pine, alternating with long stretches of treeless prairie adorned with bright flowers and waving grass, the beauty of which arrested for a moment the gaze of De Soto in his hapless march in search of gold in 1541. It is a singular coincidence that while the Alabama Daughters of 1812 are working for the Jackson Highway in commemoration of his conquest of the Creek Nation and his giving to the world the great middle basin west of the Alleghanies to civilization, Tennessee, at her Tri-State exposition held at Memphis in September, celebrated the 370th anniversary of DeSoto's first view of the Mississippi from about that point, the descendants of these Creek Indians, who found a resting place in Arkansas, riding at the head of the parade. On to the beautiful city of Mobile, on beautiful Mobile bay, a city founded on and made glorious by historic events. Mobile has just recently celebrated her bi-centennial, when at a joint flagraising the colors of five nations whose flags have floated over the city were flung to the breeze. France, Spain, England, United States, and the Confederacy. It was founded by D'Iberville and Blenville, defended against the British during

the war of 1812 by Jackson, who in 1821, took possession of the territory ceded to the United States by a treaty with Spain made in 1819. It was the home of Father Ryan, the poet-priest, and of the hero of the Alabama, Admiral Semmes.

On, on, the Jackson Highway will go, by Scranton, Miss., across bayous darkened by the long shadows of trees draped in the soft grass moss, that weird parasite that had no root or beginning and no perceptible end. It evinces no process of growth, but surely, silently weaves, decades after decades, its strange fabric, and enlists the gentle night winds to arrange its graceful festoons with no apparent care or design. On, frightened with the perfume of the jessamine and magnolia, to New Orleans, where Jackson, in command of the American forces, fought the memorable battle of New Orleans, January 8, 1815, which settled for all time English domination and interference in American affairs. The first settlers of New Orleans were the nobility and gentry of France. It is often called the "Paris of America." "Old Creole Days" have been immortalized by the pen of Cable and King. New Orleans is the largest cotton market in America, the second in the world.

Tennessee has "The Hermitage," which was preserved by an organization of patriotic Tennessee women, and there is in the capitol grounds an equestrian statue, a gift of the state. But there is not a monument in Alabama to his memory, nor a road or trail marked that Jackson went over except the one he



Macadam Road, Near Decatur, Alabama

marked himself when he planted his colors, April 17, 1814, upon Fort Toulonse and it was named by his followers Fort Jackson. Today the Colonial Dames of Alabama are planning to restore Fort Toulonse. There is a Jackson county in Alabama, and some two years ago Congressman Heflin of Alabama introduced a bill in congress asking for the appropriation of \$10,000 to erect a monument to the memory of those heroes who fell at Horseshoe Bend. The owner of the battleground has donated five acres for a park for this monument.

Baneroff says of Jackson:

"Himself the witness of the ruthlessness of savage life, he planned the removal of the Indian tribes beyond the limits of the organized states; and it is the result of his determined policy that the region east of the Mississippi has been transferred to the exclusive possession of cultivated man.

"A pupil of the wilderness, his heart was with the pioneers of American life towards the setting sun. No American statesman has ever embraced within his affections a scheme so liberal for the emigrants as that of Jackson. He longed to secure to them, not pre-emption rights only, but more than pre-emption rights. He longed to invite labor to take posession of the unoccupied fields without money and without price; with no obligation except the perpetual devotion of itself by allegiance to its country. Under the beneficent influence of his opinions, the sons of misfortune, the children of adventure, find their way to the uncultivated

west. There in some wilderness glade, or in the thick forest of the fertile plain, or where the prairies most sparkle with flowers, they, like the wild bee which sets them the example of industry, may choose their home, mark the extent of their possessions, by driving stakes or blazing trees, shelter their log cabin with the boughs and turf, and teach the virgin soil to yield itself to the ploughshare. Theirs shall be the soil, theirs the beautiful farms which they teach to be productive. His heart was ever with the pioneer, his policy ever favored the diffusion of independent freeholds throughout the laboring classes of our land."

The National Society of United Daughters of 1812 stands for educational, philanthropic and historic work. The Alabama Daughters of 1812 is a young organization and has taken as its first work, the building of this transcontinental highway as a monument of Andrew Jackson, one of America's greatest generals and statesmen, the seventh president of the United States, "Old Hickory," the man whose love and tenderness for his wife, Rachel, "a being so gentle and yet so virtuous, slander might wound, but could not dishonor," and whose chivalrous attitude toward all women won for him the admiration and plaudits of the world. Is there a man so lacking in chivalry, so wanting in patriotism, that will deny one inch of "the right of way" asked for the route of the Jackson Highway by the Alabama Daughters of 1812?

Is the National Good Roads Association a Fraud?

From Washington, through the columns of The Herald of October 1st, comes a story that is of vital importance to the cause of good roads and of unusual interest to every man interested in it. The Herald says:

Declaring that his organization is not authorized, that his motives are actuated by his own interests, and that whatever funds he obtained would go into his own pockets, officials of the Office of Public Roads of the Department of Agriculture last night denounced President Arthur Jackson, of the National Good Roads Association, following the announcement from Chicago that the latter had started a campaign to raise \$1,000,000.

The charges made against President Jackson came like a bombshell to the automobileists of this city. It is stated that post-office inspectors are already on his trail and are making determined efforts to run him down. This action was brought against him by the complaint of the public roads bureau and other associations.

If the allegations made against Mr. Jackson are true, he is responsible for one of the most gigantic wholesale fraud attempted since the days of the "Mississippi Bubble." He publicly announced his intention of raising a fund of \$1,000,000 to aid in the building of road and a campaign in congress for more legislation.

Director Logan Waller Page, of the office of Public Roads of the Agriculture Department, stated last night that there was nothing in this plan that was not self-centered and purely in the interests of Mr. Jackson.

"I have known of Mr. Jackson for some time," said Mr. Page, "and I know his motives perfectly. His plan is intended to benefit no one but himself, and the funds are to go to no one but himself. I can assert positively that Mr. Jackson's plan of operation is not one that will meet with the approval of any law-abiding citizen."

The startling charges against Mr. Jackson came following the announcement, issued in Chicago, where the National Good Roads Congress has been holding its sessions, that a campaign among the railroads, farmers, automobile companies, and manufacturers was to be started immediately.

This convention has been in session in Chicago for some time. The final announcement came just as the convention was about to adjourn.

Among other things President Jackson stated that he would at once open national offices for his organization in this city and that the subscriptions for the \$1,000,000 road improvement fund would be received here. In an address before the members of the association he outlined the future plans of the organization, saying that it was planned to elect a vice president and a member of the finance committee to represent it in each state. He declared that the campaign would be conducted along "sane business" lines, and that the fund would be held at the disposal of the society as a whole.

When this news reached Washington, charges against Jackson were at once preferred by Mr. Page. It was learned that the Agricultural Office of Public Roads has before this time made complaint to the inspectors

of the Post-office Department and that the latter were prepared to act whenever it should be definitely ascertained that Mr. Jackson was using the mails to defraud.

"We are reliably informed," said a high official of the bureau last night, "that the much mooted convention in Chicago was attended by about three persons, and that none of these had any say in the outlining of the campaign. The same scheme was tried in Baltimore about three years ago without success. This man Jackson has used the publicity given the good roads movement as a means to further his own ends. He is the kind of a man, from all we can learn, who would stop at nothing. Most remarkable is the fact

that his organization, which is unauthorized and in co-operation with no recognized organization, could be allowed to continue this long.

"He visited Washington some time ago and reserved a room in the New Willard to hold a meeting for the benefit of the good roads movement. As far as we have been able to learn, about three persons attended this meeting. This is about the caliber of all of his actions, and this is why complaint has been made against him."

Inspectors in the post office department declined to state last night what their intentions with regard to President Jackson are. It is stated, however, that prosecutions will begin within a short time.

Some Sand Clay Road Facts

Mr. Leonard Tufts, of Pinehurst, N. C., president of the Capital Highway Association, is one of the leading sand clay road experts of the nation and he has been instrumental in having built several hundred miles of this road in central North Carolina and along the route of the Capital Highway. Answering an inquiry referred to him recently, from Mr. J. M. Russ, chairman of the trustees of road district No. 3, Covington county, Miss., Mr. Tufts gave some facts that should be in the possession of every road-builder in the south. He said:

Perhaps I should have qualified my statement and said that the top soil of gravel and sand-clay roads cost \$500 per mile where the materials were near at hand and where there was not much grading or draining to be done. In this section the sand is from one to 20 feet deep but we have occasional pockets of a mixture of clay and gravel that makes excellent road material. It has been my experience that almost everywhere in the southeast where the soil is sand that these pockets are found. In many places the sand is only a foot or two deep and in some places only six or eight inches deep.

Our method in this section is to build roads only when the farmers have nothing for their teams to do. We pay 12½c. per cubic yd. for the gravel and clay delivered on the road. The pockets are near enough together so the haul is seldom more than one-fourth of a mile. The farmers work as much of the time as they can and besides getting enough to pay for their teams' feed and a small wage for themselves during idle time they get a good road in their vicinity. Of course 12½ cents is a very cheap price, but our roads do not average to cost over \$250.00 per mile.

On a 15 ft. road a yard of clay will spread an average of six inches deep and will cover the width of the road and one and one-fifth yds. lengthwise. This will take 1466 cubic yds. of clay and for hauling would amount to \$183.00. With a good lot of teams it should not take more than ten days to clay a mile. A foreman and one man as helper can spread this as fast as it is hauled. Two good mules and a plough is needed in the clay pit to loosen up the clay so those hauling can load more readily; this will amount to about \$50.00 per mile, so outside of grading and clearing the total cost of a 15 ft. road would not be over \$233.00. The most of our roads here have been 12 ft. roads and of course this reduces the cost considerably. We have followed the contours around the hills instead of making cuts and fills which are so expensive.

Now as to maintenance; a man and a pair of mules can drag ten miles of road a day. That is he can drag one side of the road for ten miles and then turn back and drag the other side back to where he started. This makes the cost in this section for each dragging less than 30 per cent per mile. As a rule it is not necessary to do this oftener than fifteen times a year. This means that it would cost about \$4.50 a year for dragging a mile of road. The rest of the money is spent in cutting back the bushes, keeping the ditches clear, and where there is gravel handy, putting the pure gravel on top of the road, which imbeds itself, through the traffic, into the surface and makes the road of a very much more permanent nature.

It is essential in building a road to spread the dirt as soon as it is dumped as it is the only way to get an even surface, and it is better still to dump on a light platform and spread it from the platform. If the piles of dirt are left in the road and spread by a road machine afterwards the surface of the road will always be wavy.

The ideal way is to employ a man with a pair of heavy mules for twelve months in the year and let him go from place to place, boarding at different houses, and in this way he should be able to maintain a hundred miles of road. It has been my experience, and that of everyone I think, that it is impractical to divide the road in small sections, giving each section to a farmer to drag and attend to, for whereas this seems to be the natural and economical way to handle it, practice has shown that the only time that the roads are attended to is when the farmer has nothing else to do and at that time the road is very apt to be in such condition as to make it undesirable to do any work upon it.

The town of Franklinton, N. C., has been wise enough to hire one of the best Highway Engineers that it has ever been my good fortune to meet, and to hire a man who has done public contracting all his life and understands handling men and teams. These two men have had the backing and support of Mr. S. C. Vann, who has spent a great deal of time on the subject. They have built their roads for less than \$60.00 per mile. Their country is very rolling and yet there are no heavy cuts or fills, and in my experience I think they have the best roads, conditions considered, that I have seen. Unfortunately the supply of such Highway Engineers is very limited.

Richland county, S. C., in which Columbia is located, also has beautiful roads and with convict labor I be-

lieve their roads cost them less than \$300.00 per mile.

Where the clay is near the surface it is only necessary to dig a ditch on one side of the road and throw the clay into the road mixing it with the sand as it is spread by the use of a harrow. In such sections I have heard the roads have been constructed for considerably less than \$200 per mile by the use of convict labor.

Alabama Good Roads Association.

The annual convention of the Alabama Good Roads Association has been called to meet in the city of Selma on Wednesday, October 25th, at 10 o'clock, and will continue in session during October 26th and 27th.

The Alabama Good Roads Association has been the pioneer in every good roads movement that has been started in the state. It inaugurated the movement for the state to appropriate money to build good roads. It conducted and secured the proper legislation creating the state highway commission. It has aided in organizing good roads associations all over the state of Alabama. It has assisted in promoting bond issues and other campaigns for the building of good roads in many counties of the state. It has lent its influence in establishing and blazing a route for the Tennessee-to-the-Gulf highway.

It is expected that this will be the most interesting convention held by this association, and large delegations are expected from every one of the sixty-seven counties of Alabama. Some of the most distinguished good roads advocates in Alabama and the United States will be in attendance and take part in the proceedings. The governor, lieutenant-governor, commissioner of agriculture, senators and members of congress, members of the state senate and house of representatives of Alabama will be entitled to seats in the convention.

Economics of Good Roads

(By D. A. Tompkins.)

Economics is simply a science of doing a thing in the cheapest and best way. Nothing is more astonishing than the variations in the cost of transportation. To illustrate this I have compiled the following table:

One horse or mule, or one H. P. electricity or steam, can pull at the rate of three miles an hour, as follows:

(1) Over common dirt road such as the average of our county roads, 1 bale of cotton (about $\frac{1}{4}$ of a ton.)

(2) Over a graded and drained road, 2 bales of cotton (about $\frac{1}{2}$ ton.)

(3) Over a graded and macadamized or sand and clay road, 4 bales of cotton (about 1 ton.)

(4) Over a graded way on a trolley track, 20 bales of cotton, (about 5 tons.)

(5) In a canal boat on a canal, 100 bales of cotton, (about 25 tons.)

(6) In a steamship on the ocean, 200 bales of cotton, (about 50 tons.)

It will be noted that the ocean is the cheapest means of transportation in the world. Next to the ocean comes the canal. The ocean is the superior of the two, because of the bigness of the ship which may be employed, and of the speed of the ship which may be attained and maintained. In a canal, if there is too much speed, the banks wash and the canal is ruined. In the olden time the ocean was practically the only means of cheap transportation, therefore, all the big cities developed on the ocean, and with ocean facilities. To

get into the interior the canal was the first cheap means, then came the railroad, still not so cheap, and yet cheap enough to go far into the interior, then came graded macadam highways. Interior points must of necessity have some better way of communication with ocean cities, and some better way of interior communication, than the old dirt road.

Civilization means civilization, which in turn means many people and multitudinous exchanges of products. This exchange is accomplished by transportation. Transportation facilities are chiefly comprised of two factors: the permanent way and the vehicle. The ocean is one permanent way, and the ship is its vehicle. The canal is another permanent way, and the canal boat is its vehicle. The railway is another permanent way, and the cars are its vehicle. The graded macadam highway is another permanent way, and the wagon or other instrument of carriage is its vehicle. The most important side of these factors is the permanent way. It counts far more than the vehicle. In most cases the vehicle couldn't move at all without the permanent way. It is almost true that on parts of the old mud roads you couldn't use any vehicles at all.

Therefore, as civilization grows, and we wish to make any community civilized, we must provide good transportation facilities of the kinds suited to the pursuits of the people. Therefore, we need good roads.

Good Roads in Moving Pictures.

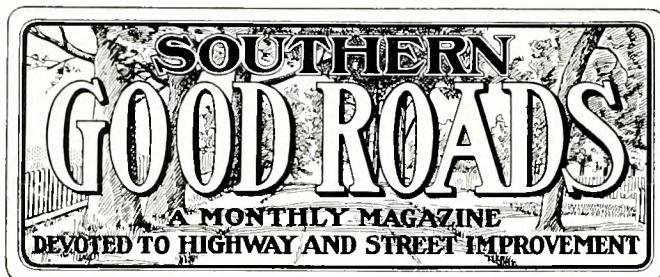
One of the most interesting features of the big convention of the American Association for Highway Improvement and the congress of its allied organizations including the Touring Club of America, at Richmond, Va., beginning November 20, will be the moving pictures that will illustrate the advantages of good roads over bad.

The United States government has just entered into a contract with a Chicago firm for the preparation of hundreds of films showing the various activities of the government. The films will show the attractions of life in the navy, the bluejackets having a good time on shore and at work on shipboard. Others will show the maneuvers of the army, the work of the Department of Agriculture, the fighting of forest fires and the rescue of entombed miners.

Most interesting of all will be the films showing how the isolation of country districts is wiped out by the building of new roads or the improvement of the old ones. Farmers will be shown struggling over bad roads, sick from the strain, the doctor unable to reach them and finally the undertaker unable to get them to their graves. There will be shown in contrast, the farmer who enjoys good roads, hauling big loads comfortably, getting sick in comfort, the doctor reaching him easily, and he will be seen on his porch watching his neighbor go to his grave smoothly and without hitch.

The American Association for Highway Improvement will have the advantage of being the first organization to show these pictures. The moving picture feature of the convention and congress will be one of the striking of the combinations of entertainment and education that will mark the event.

The danger of bad roads to automobilists will also be shown in moving picture form and will particularly appeal to hundreds of tourists who will attend the sessions of the Touring Club of America. When the convention is over it is probable that most of the films will be shown in moving picture houses throughout the United States.



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Official Organ of the South Carolina Good Roads Association

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WE ARE GROWING .

Southern Good Roads continues to grow. From its first issue there has been constant and gratifying growth, each succeeding issue going to an ever widening circle of readers. Today we can confidently assert that our circulation is larger than that of any other like publication in the United States, and, like John Paul Jones, we "haven't begun to fight yet." Not yet two years old, Southern Good Roads has outstripped every publication of its class and it is growing more rapidly now than at any time in its history.

With this issue another man is added to the staff and there will be earnest effort on the part of every man connected with the magazine to make it better in every feature, more attractive and a greater force in the road building world.

* * *

MAINTENANCE OF PUBLIC ROADS.

Although this magazine has on several occasions called attention editorially to the need of maintenance of our public roads, yet, on account of the lack of attention on the part of those in charge of the public roads of our counties to this most important phase of public road work, we wish again to emphasize the great need of the maintenance of our public roads. There are very few counties in the south which have realized to the fullest extent the importance of maintenance of public roads, and we still see county after county

raising revenue by voting bonds or other ways for the construction of public roads, and spending this money for this work without providing an adequate method for the maintenance of the roads after they are constructed. The result has been and is that fine macadam, sand-clay, and gravel roads are built at heavy expense to the county and allowed to deteriorate to the extent that when the county awakes to the fact that their good roads are disappearing it costs them from one-third to three-fourths the original cost of the road to put it back in good repair. On the other hand, if arrangements had been made to maintain the roads systematically each year they could have been kept in first class condition at a comparatively small expense.

Railroads emphasize the necessity of keeping up their road beds by employing an engineer, known as maintenance engineer, in charge of maintenance departments, whose sole work is keeping up the road bed to its highest efficiency. In public road work it is just as imperative that a department of maintenance should be inaugurated as with the railroads.

It is not only the duty of the county officials to maintain roads, but it is also the duty of the individual to do his part towards reducing the cost of maintenance of the public roads and thus preserve the life of the road at the lowest expense.

Every automobilist is a good roads enthusiast, is very apt to complain about bad roads; is constantly calling attention to the lack of maintenance of the good road; and often seems surprised at the rapid deterioration of the good road. Few of them, however, probably realize that they can be of very material assistance to those in charge of the maintenance of the roads if they would observe the road laws in regard to speeding, and also avoid as far as possible tracking, that is, each machine driving directly behind the other.

As the New York Herald has well stated, "by endeavoring through careful driving and an intelligent observation of road conditions, the motorists of the country may become a very valuable and active adjunct in the good roads movement, a movement in which the motor and automobile organizations are vitally interested, but in which the individual motorist often forgets his own responsibility."

The individual can be of assistance in reducing the cost of maintenance of our public roads by also exercising a little thought and care to keep from tracking and by using broad tires on the good roads. Our farmers along good roads can assist by stopping the practice of using the public roads as drains for their farms and by stopping the use of the road as a turning place for plow, harrow, or cultivator.

We are all apt to condemn the lack of good roads, the destruction of good roads, and the lack of maintenance of the good roads, and forget that we as individuals are responsible to a very great extent for

the condition of the public road. By working together we can not only obtain good roads throughout our state, but we can also inaugurate a system that will adequately maintain them.

Public roads have been declared by the supreme court of North Carolina to be public necessities; therefore it is within the province of our superior court judges to take action regarding the condition of the public road as they do in regard to the condition of our jails and courthouses, and we believe this extends to the maintenance of the public roads as well as to the construction of good roads.

* * *

ROAD BUILDING AS A BUSINESS.

Everyone will admit that to build a first-class public building requires an architect; to construct a machine requires a machinist; and to successfully cultivate the land requires the hand of the trained farmer. The same is true in regard to road building; to build a good road requires the services of a man who is skilled in the work—the road engineer. Skill in road construction or any other business is not acquired by merely reading a theory; it must be obtained by actual experience. A college training in road building may not be absolutely necessary to make a good road builder, but such an education will equip the engineer with a knowledge which sooner or later will more than pay for the extra time spent in its acquirement.

Road engineering is distinctly a branch by itself, and it is rapidly becoming recognized as such. To-day there is a greater demand for the road engineer than the supply, and this demand is rapidly increasing as the work of road building in the county and state progresses. Our county and road commissioners are realizing that they can only obtain the best results in road building by employing a competent road engineer to supervise the location, construction, and maintenance of the public roads.

The University of North Carolina, the A. & M. College of North Carolina, the University of South Carolina and other universities and colleges have added courses in road engineering and are doing their best to meet the demand that has arisen for road engineers.

There is no better opening for a young man than the profession of road engineer.

* * *

Good Roads in Russia.

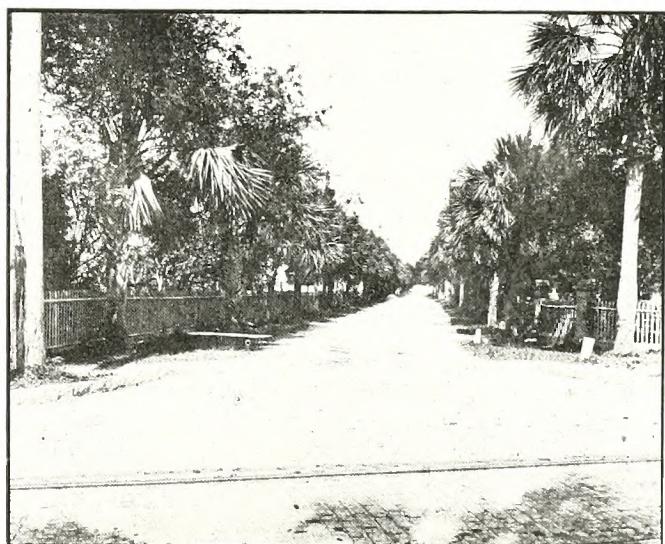
The government of Russia is outlining a scheme for the construction of 165,000 miles of new roads during the ensuing ten years. The money cost of constructing for European Russia alone, sufficient roads to provide one lineal mile to ten square miles of country, is estimated at little under \$1,000,000,000. a sum far beyond the capacity of Russia to provide for this purpose in money. But if Russia has not the money she undoubtedly has the men, and these have nowadays plenty of spare time, holidays, etc., so that the eminently practical plan of the council of ministers to get these roads

made in the course of the next decade by requiring local labor and resources to give so much otherwise wasted time to the task, materials being supplied where not found on the spot, may be adopted.

Good Roads and the Christian Religion.

At the big good roads congress held in Chicago last month, much interest was taken in the deliberations of the delegates by the ministers of the city. Rev. Samuel Fallows, of the St. Paul's Reformed Episcopal Church, preached a sermon of great power to the visitors, in the course of which he said:

"The cause of religion will be distinctly advanced by the building of good roads. The famous Roman roads, which stretched out from the Eternal City into the very heart of the provinces to be subdued, were not only employed by her conquering legions, but by the missionaries of the cross. Without these great highways the progress of Christianity could not have been rapid. Church historians have dwelt with en-



Shell Road, St. Augustine, Florida

thusiasm upon these material aids to the triumph of the faith. To-day the country churches found so numerous in all sections of our country depend upon ease of access to them by their worshipping congregations. The church at large, then, cannot be indifferent to the earnest efforts made by the Good Roads Association for the accomplishment of their ends. Every possible aid ought to be given them."

Rev. Jenkin Lloyd Jones, another Chicago minister, announced that he was preparing to undertake a campaign to have "good roads Sunday" observed in all of the churches and a special day set aside for it. Among other things he said:

"Good streets, good roads, good religion, cleanliness that is next to godliness includes also civic cleanliness. The man that walks over broken pavement and through puddles of mud, arriving at church wet and dirty, is hardly sweet natured when he enters his pew. My congregation shall surely hear of the good roads movement."

The city of Etowah, Tenn., has provided a bond issue of \$35,000 for street improvement.

Big Hill township, near Pawhuskie, Okla., has voted a bond issue of \$50,000 for the building of roads.

Cause of Good Roads Vital to the South

In a great religious convention held in the south a few years ago the president, in his annual address reviewing the religious activities of his denomination urged that it was incumbent upon the members and active church workers of the south to aid to the utmost of their ability in securing the building of good roads. "Of what avail" said he, "will be our efforts to advance the building of churches in the smaller towns and country districts of the south if impassable roads for five or six months of the year make attendance im-

must be transported. The produce of the farm is valueless until it reaches a market. The cheapness and facility with which that market can be reached sets the question of profit or loss on the raising of the stuff, and sets the value, by reason of the profit or lack of profit, on the land on which it is produced. We cannot get away from transportation. We have too long associated transportation with the thought of railroads. The railroad is a factor in transportation. Primarily, transportation comes down to the moving of things from the farm and the mine to a town or factory, or the moving of people by a buggy or wagon or other conveyance from place to place.

The advance made in human affairs by the building of railroads is scarcely greater than would be the advance made if the same energy, the same vast expenditure which is put into the railroads could be turned into the building of good highways. If suddenly over night throughout the land the more than a million miles of country roads could be transformed from a bad condition, and at times almost impassable condition, to first-class roads, the increase in the profits of the farmers, the development of the business interests in the country, the possibilities of advance in education and religious work would be beyond comprehension. We may not be able over night to work such a miracle, and possibly we will appreciate the achievements all the more after the struggle necessary to securing them. The people who are broad minded enough and energetic enough to build good roads will be the people who will get the benefit.

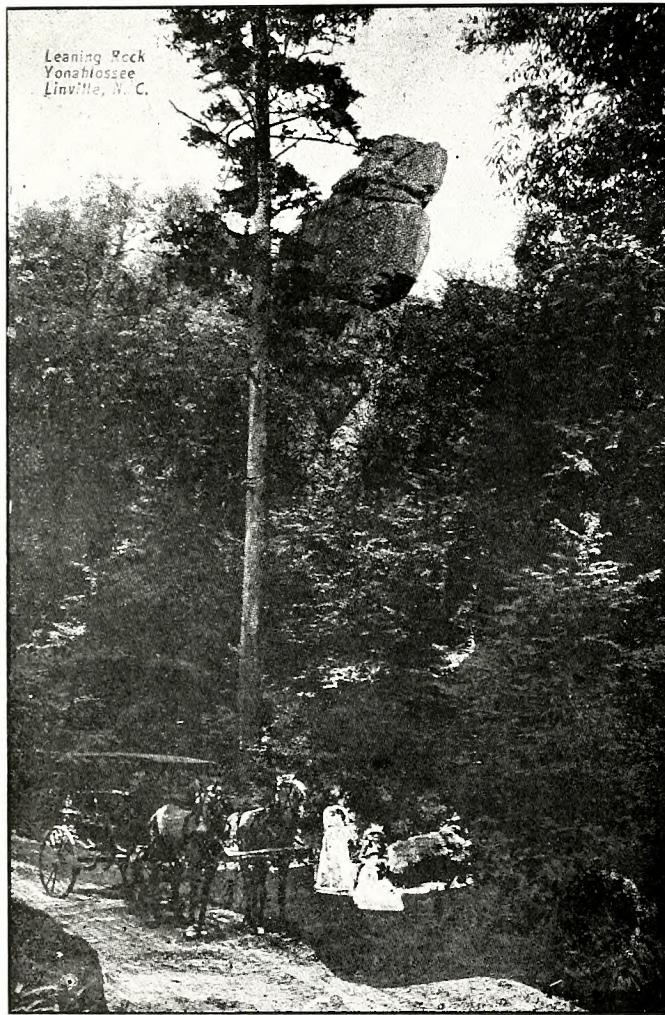
It is to be regretted that the backward community, like the backward man, cannot share equally in human advancement brought about by the stimulation of good roads, but it is one of the laws of existence that he who achieves must work. The community that desires advancement in material things as well as in higher things must be willing to work and pay the cost. The country or town that wants the value of good roads must be willing to labor unceasingly for them and to bear the burden of getting them, and yet this burden is really not a burden. It is one in name only, for there is scarcely a well populated community in all this country whose prosperity by the building of good roads would not be greatly increased beyond the cost of construction of such roads. The building of these roads is not a luxury—it is an investment returning in a hundredfold or a thousandfold. It is an investment that makes for the advancement of the comfort of the people, for the enlargement of their profits, for the betterment of every condition under which mankind exists.

At Columbia, Mo., in September, the Columbia road district voted a bond issue of \$100,000 to build a system of good roads.

McGregor justice precinct, McGregor, Tex., has voted \$100,000 of bonds for the building of good roads.

The bond election that was to have been held this month in Levy county, Fla., has been postponed indefinitely.

The city of Cordele, Ga., contemplates the issue of \$100,000 additional bonds for the paving of streets and the building of bridges and culverts.



Leaning Rock, Yonahlossee Turnpike, Linville, North Carolina

possible?" The building of good roads as he regarded the subject, was a Christian duty, and among the activities suggested by him for work for the advancement of religious life in the south, the awakening of the people to the importance of good roads was stressed as one of the essential things. No man who studies the matter can look upon it in any other light.

It is doubtful if there is any better influence for the betterment of life, the advancement of every influence for civilization, Christianity and education and the material upbuilding of the south than that of good roads. Transportation is the fundamental thing in all human affairs. We must move from place to place; we must travel by rail or water or land; goods of all kinds, the product of the farm and the factory alike,

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Arkansas.

At the last session of the Arkansas legislature, Senator H. K. Toney introduced a bill providing for a state highway connecting Little Rock and Pine Bluff. It passed the legislature and was vetoed by Governor Donaghey on the ground that the proposed road ran through a sparsely settled section, too poor, agriculturally, to bear the expense of building and maintenance. The governor also stated that it was his belief that the people did not want the road and that the bill got through the legislature by high pressure methods. Senator Toney declares that the governor vetoed the bill in order to get even with the senator, who opposed several pet schemes of the governor in the legislature and succeeded in breaking up two of them.

Senator Toney and his friends do not admit defeat. They are proceeding under the state law to form a special road improvement district to cover the route of the proposed highway and are starting a campaign for a bond issue to build the road. Through the intervening counties petitions will be circulated and it is believed that in spite of the governor's veto the two cities will yet be connected.

Along the proposed route lies the Iron Mountain Railway and it is charged that this road influenced the governor in vetoing the bill. The railway would have to bear about one half of the entire expense of the road, as 109 miles of its line lies in the proposed district.

Governor O'Neal in his first message to the 1911 legislature of Alabama advocated a highway bill and state aid, as championed by the Alabama Good Roads Association; he recognized the fact that the improvement of the country roads of Alabama would mean more prosperity. It required the courage of a statesman to advocate this measure when the treasury was empty. The Alabama Good Roads Association has been laboring to educate the farmer, for the city man is in nearly all cases a good roads advocate. The awakening for the building of good roads is the greatest in the history of the state. The legislature passed the bills favored by Governor O'Neal.

The Highway Commission has been appointed. Together with its engineer and his corps of assistants, the commission is busily engaged going from county to county giving state aid and advice to the various counties that are applying for state aid in constructing their roads.

Many of the counties now have business methods in constructing their roads; they also have competent engineers. In the county of Montgomery where formerly a pair of mules could sometimes not haul even a bale of cotton, they can now haul from six to ten bales, as Montgomery county's roads are among the finest in the state.

The counties of Jefferson, Mobile, Pike, Claire, Dallas and other counties are issuing bonds and are building modern roads. Mobile county has recently bonded itself for \$500,000. The counties of Jefferson, Shelby, Chilton, Elmore, Autauga and Montgomery are constructing an inter-county system of highways which will be the first link in the state system of highways.

The Alabama Good Roads Association has given a

fine evidence of persistency. It has been educating the people and the law makers to the economic value and the necessity for having good roads. In October 1906 at a convention a bill was prepared to be submitted to the legislature to create a highway commission to adopt business methods in road construction in the state of Alabama, as the system in vogue for a number of years was an unbusinesslike and hap-hazard one.

The \$2,000,000 a year that was being expended by the county commissioners for building roads, without any engineer or any one competent to build roads, was being absolutely wasted; and for this vast sum of money not a single mile of permanent road was constructed. When the committee of the Alabama Good Roads Association appeared before the legislature in 1907 and presented their bill, the committee on Common Carriers adverised the bill, claiming it was unconstitutional, stating that the state had no authority to appropriate any money or lend its credit for internal improvements.

The committee appeared at the adjourned session of the legislature in 1907 and had a bill enacted after a strenuous fight. The bill enacted called for amendments to the constitution of the state, which was submitted to the people later on. The committee succeeded in having the constitution amended.

Then when Governor O'Neal and Col. Mallory were candidates for governor, the Alabama Good Roads Association held a convention in Montgomery and had the respective candidates pledge themselves to the association and to the people that they would favor the establishment of a Highway Commission so the roads could be supervised and constructed by business methods.

A telegram from John Craft, President of the Alabama Good Roads Association to the Southern Commercial Congress, says:

"Your letter just received on my return from Lamar county. The largest meeting in the history of the county and bond issue endorsed. Alabama improved roads will average 20 to 25 per cent over last estimate 3:43 per cent. Great interest is being manifested and bonds are being issued by many counties showing our people want good roads and paying for them."

Kentucky.

Fayette county, Ky., of which Lexington is the county seat, is the center of the Blue Grass region, which is known throughout the world for its good roads.

In Fayette county alone, there are more than three hundred and fifty miles of macadamized roads or turnpikes. Nearly half a million dollars has been spent by Fayette county during the past five years in building and maintenance of these pikes. The surrounding counties are also well supplied with pikes.

Radiating from Lexington there are thirteen of these roads and some of them continue through county after county for very long distances in the state; one of these pikes being called the Maysville pike, another the Cincinnati pike and others running to Louisville and elsewhere connected with Lexington by these pikes, which are always kept in first class condition.

While it is true that some of the best roads to be found in this entire world are located in Kentucky in the Blue Grass, it is also true that perhaps some of the worst roads to be found anywhere are located in some parts of the state. It must be remembered however, that certain portions of Kentucky, have been a closed book so far as the world is concerned until very recently. New marvelous deposits of coal and timber and other natural resources are fast being opened up through the building of railroads and the advent of foreign capital.

At the session of the legislature which met in 1908 a bill providing for a constitutional amendment which vested the counties with the right of voting bonds for good roads throughout the state was passed.

Two years ago this constitutional amendment was submitted to the people of the state for their acceptance or rejection and the amendment was passed and is to-day a law.

S. H. Clay, Secretary of the Lexington Commercial Club, in a letter to Mr. G. Grosvenor Dawe, of the Southern Commercial Congress, says regarding this amendment:

"From my personal knowledge I do not know of any county in the state which has taken advantage of this amendment, but I do know that in Southeastern Kentucky a strong movement is on foot to promote a state highway from that section through this section north to the Ohio river, very likely connecting with Cincinnati."

In general, the good roads movement in Kentucky is fast becoming of state-wide importance and its friends are increasing by the minute. With the present increase in sentiment there is little doubt but that Kentucky will soon eliminate most of the bad roads section within its confines.

* * *
Oklahoma.

A telegram from Prof. Charles N. Gould, State Geologist of Oklahoma, says:

"Less than one per cent permanently improved roads in Oklahoma."

This is quoted first in order to emphasize the task and the difficulties Oklahoma has before her. Regarding good roads development in Oklahoma, Prof. Gould has written:

"Very few of the states have greater need for good roads than has Oklahoma, and few states are attempting to solve the good roads problem more intelligently.

"Oklahoma is a new state. Throughout the greater part of the state up until a few years ago very few of the roads were little more than trails, leading from town to town, or from one army post to another. These trails naturally followed the line of least resistance crossing the low gaps in the hills; winding through the valleys to seek some favorable ford.

"With the past few years the land in the greater part of the state has been settled. The old trails have been fenced in, and the section lines opened up. According to the state law every section line in Oklahoma is a public road. Throughout the greater part of the state, particularly in the western counties, which are comparatively level, there is little difficulty in making good roads on section lines. In eastern Oklahoma, however, which is hilly, section lines are in many cases impossible."

The greatest difficulty in securing good roads in the new state has been in securing a sufficient number of bridges. The road law, passed by the first legislature,

was fairly successful in the matter of opening up and developing public roads. The last legislature established the office of Highway Commissioner, and Governor Crnce has recently appointed to that position Sydney Suggs, a man who for a number of years has been interested in highway construction and has been president of the State Good Roads Association.

The Geological Survey has given considerable attention to the matter of road building material in the state.

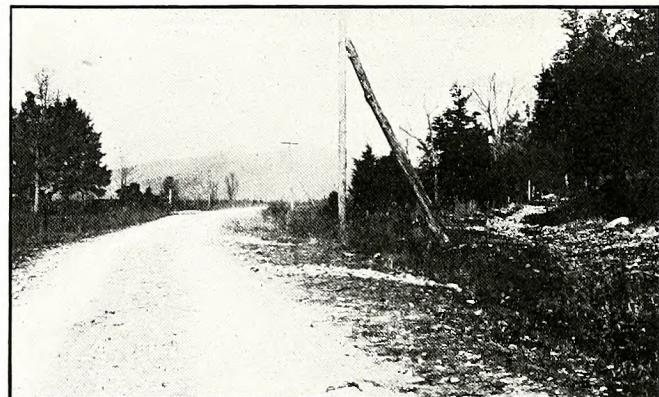
Mr. L. C. Snider, assistant director of the Geological Survey is engaged now on a press bulletin on the subject, which will be ready for distribution soon.

By the provision of a state law, county prisoners and short term penitentiary convicts may be employed on public roads. Practically all the counties in the state have taken advantage of the law and many miles of good roads have been constructed.

Up to the present time very little has been done in the way of macadam or similar construction, but a number of localities are now preparing to surface the public roads.

* * *
Missouri.

Considerable interest is taken in the proposed cross-Missouri State road and several routes are suggested



Horkensville Pike, Looking West, one mile from Scottsboro, Alabama. This is a re-location, and the old road is shown to the right. Traffic one place only has caused wheel ruts to form and the center to ravel

for the highway. The Kansas City Chapter Daughters of the American Revolution appointed a Sante Fe trail committee to look over the proposed route, and the committee reported in favor of the Boone's Lick road and the Santa Fe trail as the most logical route. The old Boone's Lick road extends from St. Louis through St. Charles, Warrenton, Danville, Fulton and Columbia to Old Franklin. That section of the Santa Fe trail in Missouri, runs from Old Franklin to Westport and New Santa Fe, through Fayette, Arrow Rock, Marshall, Grand Pass, Dover, Berlin, Lexington, Napoleon and Independence.

* * *
North Carolina.

In a striking address delivered before the Interstate Good Roads Conference at Mountain Lake, Md., some time ago, Mr. G. Grosvenor Dawe, managing director of the Southern Commercial Congress, had the following review of road activity in North Carolina:

The most prominent and striking advancements in the public road work that have been made in North Carolina during the past year are the authorization by the general assembly of 1911 of the Central Highway,

a road which will extend from Beaufort Harbor to the Tennessee line; and the realization of the counties of the need of competent road engineers to supervise the location, construction and maintenance of their public roads.

Joseph Hyde Pratt, State Geologist says in letter dated June 29th:

"The second advance in road work has been made in road engineering, and now there are a number of the counties and townships that are employing road engineers to have charge of all their road work and they are paying them salaries ranging from \$1,500 to \$2,600 per year.

In order to carry on the road work more effectually, county good roads associations are being organized and there are now nearly forty in this state affiliated with the state association, and these county good roads associations are doing a great work in creating and arousing an interest for good roads in their counties.

The development along these three lines will mean that the state will be able to obtain a system of inter-county roads which will connect all parts of the state, and will do away with what is now so apparent in many of our southern states—stretches of good road separated from each other by stretches of bad road. It will also mean that the people of North Carolina will insist that the general assembly of 1913 pass measures creating a State Highway Commission and some form of state aid to the counties in public road work."

In a telegram from Mr. Pratt he wires this encouraging statement:

"Percentage of improved roads in North Carolina is ten and two tenths per cent."

In 1904 the state was credited with 2.52 per cent.

In passing from North Carolina I wish to comment upon the thoroughness and zeal of Dr. Pratt. He has just issued Good Roads Circular 65, detailing public road work in North Carolina during 1910. It is the best thing of the kind that I have seen come out of the whole south. I wish that each state could prepare and distribute such a compilation of useful facts.

* * *

Tennessee.

More than \$2,500,000 is being invested in good roads by the counties that center around Bristol in East Tennessee, and in Southwest Virginia. When the New York Herald-Athens Journal sent cars ran through the south about two years ago the pathfinders declared that the roads were the worst they had ever encountered.

As a result of the terrible condition of the highways, the scouts, even with large and powerful cars, were able to negotiate only a few miles a day. The criticism the roads received at that time on account of their frightful condition started the movement that has resulted in the appropriation of a vast sum of money for modern macadamized highways.

Within two years the Memphis-to-Bristol highway, a macadamized pike extending diagonally across the state, will be completed, and already a movement is on foot for the building of a highway from Bristol to Washington. This will give one stretch of graded and macadamized road 1,000 miles in length and extending from the capital city diagonally across the Old Dominion and from Bristol diagonally across Tennessee to Memphis, on the Mississippi river.

Sullivan county, in which half of Bristol is situated, is expending a \$300,000 bond issue for pike roads, while an additional issue of \$200,000 will be made at

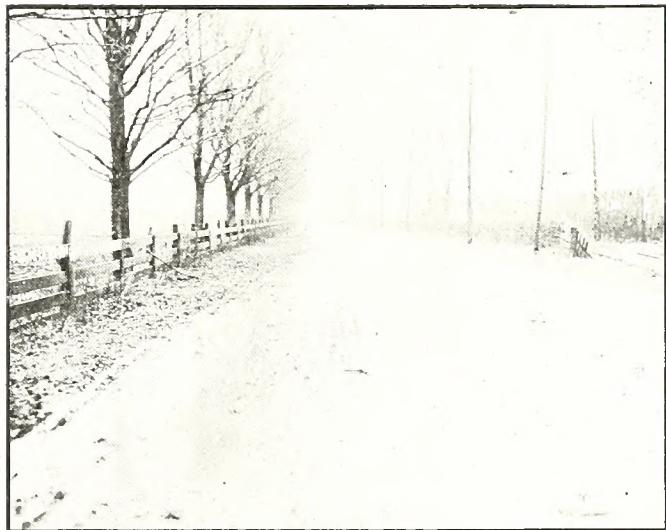
once under an enabling act passed by the last legislature. Washington county, Va., in which the other half of Bristol is located, is preparing at once to spend \$250,000 for macadamized roads, and the city of Bristol has voluntarily appropriated \$50,000 to aid in this work.

* * *

Texas.

Texas annually pays a toll of eight million dollars because of bad roads. Down in Shreveport, La., the other day there was a gathering of good roads enthusiasts, in which many Texans participated. One of these was Secretary Ellison of the Longview Chamber of Commerce, who, in the course of arguing for a first class road from Shreveport to Dallas, gave these interesting facts:

"The Texas farmers last year marketed approximately 8,000,000 tons of products. It cost 43 cents per ton per mile to reach the market in Texas and the average distance hauled was only five miles. The government average is only 23 cents. Now let's figure out in dollars the loss of the Texas farmer. If the Texas farmers raised 8,000,000 tons of farm products and it



Macadam Road, Bowling Green, Kentucky

cost him 43 cents per ton per mile to reach the market, and the average distance hauled was five miles, and it only cost 23 cents per ton per mile on an average throughout the United States, then the Texas farmers did lose 20 cents per ton per mile on 8,000,000 tons of products on every mile he hauled his goods; so the total loss on one mile must be \$1,600,000, but the average haul was five miles, so it must be five times that amount, which would be \$8,000,000 annually that the farmers of Texas lose on account of bad roads."

Incidentally attention was also called to the fact that the total fire losses in the state of Texas last year reached \$4,000,000 and the losses from bad roads reached more than twice that sum. Mr. Ellison concluded with this effective argument:

"The Federal Government has spent over \$1,000,000 in trying to find a way of eradicating the boll weevil, but we do not have to spend money to learn how to eradicate bad roads—build good ones."

Iredell county, N. C., is beginning to spend a part of its \$400,000 bond issue. Arrangements are being made to proceed with the construction of 17 miles of the proposed county system of good roads.

GOOD ROADS NOTES IN BRIEF

The Louisiana Highway Department is asking for bids on the construction of 12 miles of road in Franklin parish.

Tulsa, Okla., one of the most progressive cities in the new state, has contracted for the paving of 139 blocks.

Houston Heights, Tex., votes on the 10th of this month on a bond issue of \$180,000 for street improvement.

Killeen, Tex., will vote soon on a bond issue for street improvement.

Lane county, Okla., has voted a bond issue of \$75,000 for the building of streets and bridges.

Colquitt county, Ga., will vote soon on a bond issue of \$200,000 for the building of good roads.

The city of Petersburg, Va., contemplates the issuance of bonds to the amount of \$150,000 for street improvement.

The town of Pineville, Ky., will vote next month on a bond issue of \$15,000 for macadamizing streets.

Precinct No. 1, Wichita county, Tex., will vote this month on a bond issue of \$150,000 for roadbuilding.

Monroe county, Miss., has contracted for the construction of 50 miles of road at a cost of \$40,000 for grading and \$25,000 for concrete work.

Buncombe county, N. C., has contracted recently for a large amount of grading.

The city of Waco, Tex., will issue street improvement bonds to the amount of \$50,000.

Baltimore, Md., has contracted for a great deal of street paving.

Jacksonville, Fla., is spending more than \$100,000 on paving with vitrified brick and other materials.

The Highway Department of Louisiana has contracted for road building in St. Bernard parish to the amount of \$12,637. The roads are to be built of shell.

At Charlotte, Tenn., the Dickson County Turnpike Company has been organized to construct 15 miles of road. The company has a capital stock of \$20,000.

In Walker county, Tex., the commissioners are having 75 miles of road surveyed with the view of making extensive improvements of a permanent nature.

Marion county, S. C., will build 100 miles of sand-clay road.

The city of Palatka, Fla., will construct seven miles of vitrified brick paving.

Terrel county, Tex., is asking for bids on a great deal of road work.

Pettis county, Mo., will build about four miles of first class macadam road.

At Shreveport, La., \$150,000 is to be spent on bituminous paving.

Monroe county, Tennessee, has issued bonds for the improvement of its roads to the amount of \$300,000.

New Orleans has been chosen as the meeting-place for the International Good Roads Congress and Exposition in 1912.

More than \$20,000 worth of work was done on the roads of Pulaski county, Ky., during Good Roads Week, in September.

Greenville county, S. C., has appropriated \$4,000 to construct a road from Tigerville to Merrittsville.

Wharton, Tex., will spend \$4,000 building additional sidewalks.

The city of Gainesville, Fla., votes this month on a bond issue of \$35,000 for street improvement.

At Fulton, Mo., the Fulton road district has voted a bond issue of \$100,000 for the construction of a fine system of macadam roads.

Tulsa county, Okla., after a campaign lasting two years, voted on September 22, a bond issue of \$500,000 for the building of roads. The majority for roads was almost 5 to 1. The assessed valuation of property in the proposed district is \$32,000,000 and the commissioners have already had offers for the entire issue at par. This progressive county now has \$660,000, including the bond issue, available for road work and will construct 120 miles of the best road known to modern road-builders.

The town of Whiteville, Tenn., has voted a bond issue of \$10,000 for street improvement.

Polk county, Fla., votes this month on a bond issue of \$500,000 for road building.

Putnam county, Florida, will construct a shell road from Sisco, Fla., passing through Pomona toward Crescent City.

The city of Pensacola, Fla., invites bids until Nov. 7th for about fourteen miles of street paving.

The Auditor of Dallas county, Texas, will receive bids until Nov. 1 on \$500,000 4 1/2 per cent good roads bonds.

“Good Roads” will be the keynote of the business to be transacted by the Transmississippi Commercial Congress to be held this year at Kansas City, Mo., November 14 to 17 inclusive. The Transmississippi Congress is devoted to the development of the substantial interests of the entire country west of the Mississippi. This will be its twenty-second session.

The first good roads association in southwestern Oklahoma was organized at Hobart October 12.

The national good roads board of the American Automobile Association is trying to impress upon the road builders of this country the importance not only of constructing new roads, but of maintaining the old ones in such a condition that they will be lasting. The board has been paying no little attention to the road system of France, which is looked upon as a nation of road builders.

November 14th, Halifax county, North Carolina, will vote on a \$300,000 bond issue for road construction.

Burlington, N. C., has awarded a \$50,000 contract for street improvement.

Gadsden, Ala., has awarded contracts to construct sidewalks, streets and gutters to cost \$6,000.

The city of Hamlin, Tex., is spending \$40,000 for street paving.

Lee county, Virginia, has awarded contracts for macadamizing 80 miles of road, and grading 60 miles.

The State Board of Education of Tennessee is spending \$8,700 for a road at Murfreesboro.

The city of Novata, Okla., is laying asphalt pavement at a cost of \$53,935.85.

St. Louis, Mo., has awarded a contract to grade the grounds in front of the city hall and municipal courts building at \$30,500.

The city of Baltimore, Md., will pave all the streets around the Fifth Regiment Armory.

Chester county, S. C., is preparing to construct a highway from Chester to Lewis.

Duval county, Florida, invites bids for paving St. Johns avenue and Lake Shore drive with asphalt macadam, hard-surfacing Mayport Road, and clearing and grading Pensacola Road.

The city of Little Rock, Ark., is preparing to pave a section of Main street with creosoted wooden blocks, or asphalt.

Early county, Ga., has voted \$100,000 of bonds for the building of good roads.

The city of Marlin, Tex., has voted a large bond issue for street paving.

The city of Cordele, Ga., contemplates the expenditure of \$125,000 on street improvement. A bond election will be called soon to vote on a issue of \$100,000.

For some reason best known to those behind the movement, the election that was to have been held in Laurens county, Ga., on Sept. 6 to decide on a bond issue of \$300,000 for roads, has been postponed until January 9, 1912.

Butts county, Ga., is planning to vote on a bond issue of \$100,000 for roads.

The city council of Lynchburg, Va., will recommend that a bond issue of \$650,000 be voted for street work.

Salem, N. C., will vote on December 26th, on a bond issue of \$15,000 for roads.

At Big Stone Gap, Va., the Clark County Construction Company has been awarded a contract for the building of 20 miles of macadam.

Precinct No. 1, Milam county, Tex., will vote on a bond issue of \$100,000 soon.

Tazewell county, Va., has recently awarded a contract for seven miles of macadam.

Caroline county, Md., has let a contract for several miles of state road.

At Hendersonville, N. C., a contract has been let for five miles of good roads.

The city High Point, N. C., has contracted for 10,000 linear feet of curbing.

The city of Huntington, W. Va., has contracted for 65,000 square yards of brick pavement.

At Kansas City, Mo., a contract has been awarded for the grading of four miles of road at a cost of \$20,600.

The city of Salem, N. C., has contracted for a considerable amount of paving with macadam, tarvia binding.

Wise county, Va., has contracted for 275,000 square yards of macadam on road already graded.

Buncombe county, N. C., has been asking for bids on road grading.

Austin, Tex., will spend \$35,000 on bitulithic paving.

Leon county, Tex., is asking for bids on a great deal of sand-clay road work.

Columbia, S. C., will spend a great deal of money on bitulithic streets.

Denison, Tex., will pave several streets with brick.

Cecil county, Md., is asking for bids on four miles of road.

Rankin county, Miss., will build a good road from Jackson to Brandon.

Lexington, Tenn., will gravel several important streets.

Martinsburg, W. Va., will macadamize several important streets.

The Highway Department of the State Board of Engineers of Louisiana, is asking for bids on a great deal of road work.

Huntsville, Ala., is preparing to build 1000 feet of tarvia pavement.

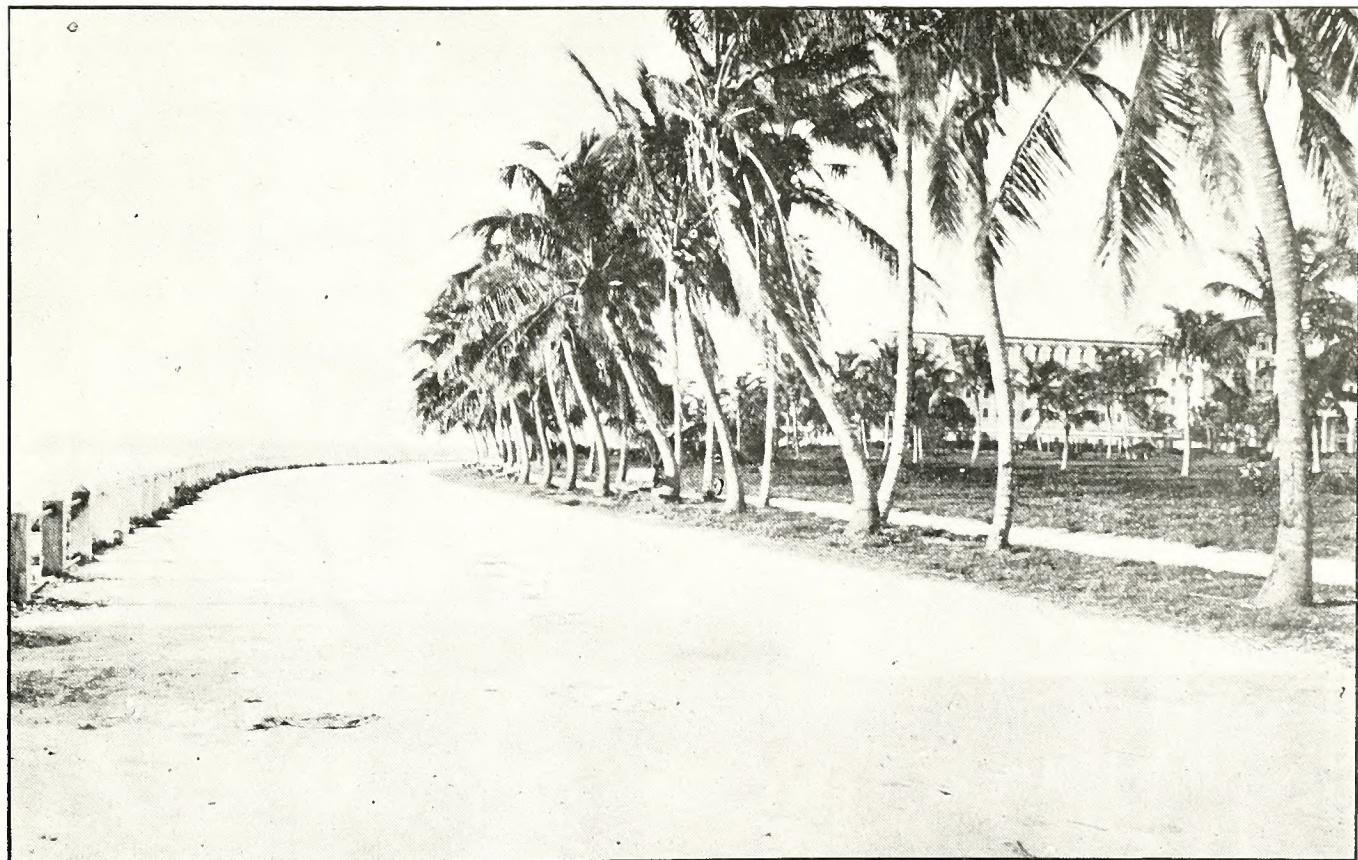
Blount county, Ala., will spend \$4,000 on a certain portion of the State Highway.

The town of Park, Tenn., will spend \$15,000 on five miles of roads.

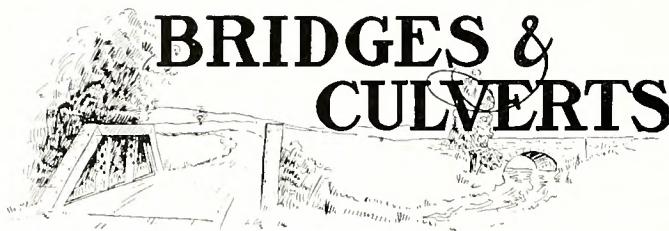
Sweetwater, Tex., will spend \$35,000 on macadam paving.

Ohio county, W. Va., will macadamize several miles of road with blue, or gray limestone.

San Antonio, Tex., has appropriated \$12,000 for street work.



Shell Road Near Miami, Florida. On the Miami-Quebec International Highway



BRIDGES & CULVERTS

In Manatee county, Fla., a bridge is to be built at a cost of \$15,000 to connect the mainland and Gulf Beach to the Key.

Fannin county, Ga., has contracted for a bridge across Toccoa river.

Hopkins county, Ky., will construct a bridge across the Pond River at considerable expense.

Allen county, Ky., will build two bridges along the Lincoln Highway.

Kansas City, Mo., has contracted for the construction of a bridge across Blue River at a cost of a little than \$20,000.

Jackson county, Mo., has contracted for bridge work amounting to \$37,000.

Washington county, Okla., is asking for bids on the construction of five bridges.

Pottawattamie county, Okla., has awarded a contract for a bridge across Canadian river.

Hamilton county, Tenn., will build six culverts.

The city of Fort Worth, Tex., contemplates the erection of a bridge across Trinity river at a cost of \$2,000,000. An election will be called to vote on bonds.

The city of Houston, Tex., is asking for bids on the construction of two costly bridges across White Oak Bayou.

The Florida East Coast Railway is preparing to construct a bascule bridge 54 feet long, and two trestles; one of 9000 feet over Econlockhatches Creek and one of 1500 feet over St. Johns river.

Augusta, Ga., will build a 150-foot steel bridge over a canal at Fifteenth street.

The Commissioners of Jackson county, Mo., have awarded a contract at \$2930 to build reinforced concrete bridge over Sugar creek on the Atherton and Sibley road.

Fayette county, Tenn., has awarded contracts for five steel bridges to cost \$14,100.

Gassaway, W. Va., has awarded a contract for the construction of a steel bridge to cost \$20,000.

At Baxley, Ga., a bridge is to be built across the Altamaha river, costing \$30,000.

Kansas City, Mo., is planning to build a bridge to cost \$550,000. It will have two paved roadways, each 30 feet wide, with sidewalks 5 feet wide and space for double street car tracks.

At Kansas City, Mo., a bridge is to be built across Brush creek at a cost of \$15,000.

At St. Louis, Mo., a bridge is to be built across the Mississippi, 1600 feet long and costing \$1,500,000.

Guilford county, N. C., will build two steel bridges, each 60 feet long.

Choctaw county, Okla., has contracted for 21 bridges at a cost of \$73,103.

At Charleston, S. C., about \$8,000 is being spent to repair the bridges recently destroyed by a storm.

A bridge is to be constructed across the Pee Dee river at Florence, S. C., at a cost of \$75,000.

Edgefield county, S. C., will build a long bridge across Big Stevens creek near Modoc.

The highway department of Virginia is asking for bids on five steel bridges.

The city of Portsmouth, Va., contemplates the construction of a bridge and concrete culvert at Swimming Point.

Wetzel county, W. Va., is asking for bids on a number of steel bridges.

Jefferson county, Ala., will build a bridge across Warrior river at a cost of \$15,000.

Duval and Nassau counties, Fla., will build a bridge across the Nassau river.

The city of Tampa, Fla., has awarded a contract for the construction of a bridge across the Hillsborough river at a cost of \$205,000.

Harrison county, Miss., will build two good bridges, one across the Tuxichana river and the other over Saucier creek.

LaFayette county, Mo., will construct 60 culverts on the Santa Fe road.

A contract has been awarded for a steel bridge across the Buffalo Shoals ford on the Catawba river, between Iredell and Catawba counties, N. C. The bridge will be 800 feet long.

Fayette county, Tenn., will construct five steel bridges.

The city of Arlington, Tex., is contemplating the calling of an election to decide on \$600,000 worth of bridge work.

A bridge is being planned to span the Ohio river at Parkersburg, W. Va., to cost \$500,000.

Manatee county, Fla., contemplates voting next month on a bond issue of \$100,000 to build a bridge across the Manatee River. The estimated cost of the bridge is \$85,000. With the remainder, three bridges near Manatee will be built.

Bartow county, Ga., will construct a reinforced concrete bridge on Webster Ferry road.

Colquitt county, Ga., will vote soon on a bond issue of \$85,000 to build steel bridges.

A bridge is to be built across the Calcasieu river at Lake Charles, La.

Marion county, Miss., has contracted for a steel bridge across the Upper Little River, at Edna.

Guilford county, N. C., has contracted for two bridges across Horse Pen Creek and South Buffalo Creek.

Grady county, Okla., votes this month on a bond issue of \$40,000 to build a number of bridges. With this sum the commissioners propose to construct eighty bridges.

Love county, Okla., is planning a bond issue of \$75,000 for bridges and culverts, in connection with the improvement of certain roads.

Oklahoma county, Okla., has recently awarded contracts for three steel bridges.

New Jersey to Test the Patrol System of Maintenance.

The State Highway Commissioner of New Jersey, Col. E. A. Stevens, will in a short time employ several men to look after short stretches of road, much in the same manner as the French Department of Roads and Bridges provide for the maintenance of the many thousand miles of national roads under its direction. Each of these patrolmen will be given a short stretch of road to look after, and it will be his duty to patrol it constantly, keep the ditches and culverts open, the weeds cut, and to repair all defects in the road as soon as they appear. To enable them to do this properly, material for repair will be placed at short intervals along the roadside. Colonel Steven's experiment will be watched with much interest, as by far the most important problem confronting road officials in this country is that of road maintenance.

Georgia Congressman's Good Roads Bill.

If the bill introduced by William S. Howard, representative from Georgia, becomes a law—and it should for it is a good bill—there will be some momentous road improvements in United States.

Representative Howard's scheme is that the state and the federal government unite in improving post roads and rural free delivery routes. Under the bill the federal department of agriculture and the director of roads shall have supervision over the work and shall employ all assistance necessary.

The bill provides for the creation of a fund to be known as the "federal highway fund" to be used for the construction and improvement of public highways. This highway fund is to be made up of all surplus monies in the treasury to be distributed among the several states according to population. In this connection, the bill provides that the director of public roads in making his estimates of the amount to be distributed to each state shall exclude from his estimates all people residing in cities of more than 15,000 population. The director of public roads is further authorized to adopt a standard highway as to width and other conditions, taking into consideration the materials available for such purpose in the different states and territories, and under the provisions of the bill no aid is to be given any state not willing in advance to construct any highway contemplated in conformity with the specifications of the director of public roads.

The bill further provides that all applications to participate in the highway fund shall be made through the commissioner or chief officer of the agricultural department of the state desiring such aid to the director of public roads of the United States department of agriculture and all applications must state that the aid sought is for a rural route or post road, naming its location, number of miles to be built, the available native material, and stating whether free labor or convict labor is to be employed in the construction of the highway. All highways constructed under provisions of the bill are to be built under the joint supervision of the authorities of the state in which the highway is to be constructed.

The bill also provides that if upon application to the director of public roads for federal aid in the construction of public roads it appears that 50 per cent. of the funds necessary to complete the work is available on the part of the state or county of the state and available labor necessary to carry on the work, the director of public roads shall lend such aid necessary for the work.

Pacific Highway Convention a Success.

The first annual convention of the Pacific Highway Association, held at Portland, Oregon, last month was well attended by delegates, and what promises much future good for the people up and down the coast was given a great impetus by the active interest taken in the completion of the great project of a road to extend from Vancouver to Mexico.

Comprehensive plans for getting popular support from auto and good roads clubs in the three coast states were made. Working districts were mapped out and recognition given all fields by the appointment of vice presidents.

Within four weeks sign posts will have been erected in Oregon, from north to south, marking the route of the Pacific highway through Oregon. It has already been marked through Washington and California. M. C. Dickinson of the Portland Automobile club at the

meeting of the Pacific highway association pledged himself to see that this work is done. He has placed an order for the signs and as soon as they are ready, F. M. Fretwell of Seattle, secretary of the association, and M. K. MacRae will travel over the route and have them set in place.

The plan of the organization, as outlined in the by-laws adopted, will be to work through local associations in the future, instead of through individuals, as has been done in the past year. Local associations interested in the good roads movement will be enlisted in the Pacific highway movement and pledged to do each its share in its own vicinity. The improved sections of road may be designated by special names if so desired, but will be included in the coast wide schemes of the highway.

Five vice presidents were elected, two for British Columbia and one each for California, Washington and Oregon. These vice presidents will work under the central organization and will have general supervision in their own localities.

The report of the nominating committee submitted at the convention returned Judge J. T. Ronald as president and F. M. Fretwell as secretary, and was passed with a unanimous vote, although Judge Ronald protested vigorously against having the honor thrust upon him a second time. Vice presidents were chosen as follows: F. M. McCandles of Seattle, F. B. Riley of Portland, A. E. Todd of Victoria, B. C.; C. A. Ross of Vancouver, B. C., and J. S. Mitchell of Los Angeles. The selection of a vice president for northern California was postponed until communications could be held with the good roads associations of that locality.

Intense enthusiasm prevailed the entire session and all the speakers agreed if predicting that the opening of the highway from the Mexican line to Alaska was now only a matter of a short time. W. J. Roberts, state highway commissioner from Washington, said: "I believe that the Pacific highway project stands second only in the good it can do the Pacific coast to the Panama canal."

Joseph Blethen of the Seattle Daily Times; A. W. Gould, president of the Seattle Automobile club, and F. M. McCandles gave short addresses, reviewing the work that had already been accomplished, and discussing methods for furthering the movement. C. C. Chapman of the Portland Commercial club spoke on the benefits that the northwest would receive in annual tourist travel from the south when the road is opened, and J. H. Albert of Salem, Ore., brought greetings to the association for the state capitol.

Good Roads and Potatoes.

State Geologist W. O. Hotchkiss, of Wisconsin, tells how one farmer of that state became a believer in good roads. This man had a thousand bushels of potatoes in the cellar which he was holding for a good price. An offer of 92 cents came in March, but, as he expressed it, the roads were so bad that the only way he could get to town was by telephone. Of course, the roads finally dried out, and then he secured 30 cents a bushel for his potatoes. Hence, rightly, he assumed that bad roads had cost him something over \$600, and he likewise figured that if all the main roads in the county had been improved his share would not have been as much as the loss on his crop of potatoes. Mr. Hotchkiss sums up the situation very concisely in this sentence: "Good roads benefit us at every turn, and bad roads are an extravagance that no people can afford."

Tulsa, Okla., has contracted for the paving of 33 streets and alleys.

Forsyth county, N. C., will spend a large sum of money in improving six of the main roads leading into Winston-Salem.

A good road is to be built between High Point and Winston-Salem, N. C. It will be of sand-clay and macadam and will be built mainly by private subscription. The length of the road is 18 miles.

It has been announced that Hardin county, Kentucky, will reconstruct the Louisville and Nashville pike.

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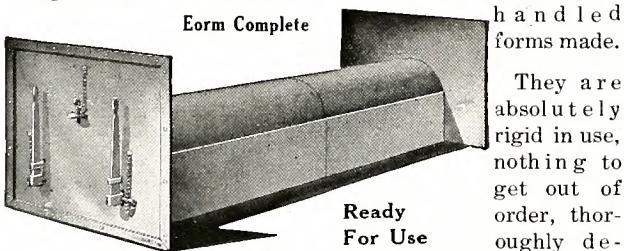
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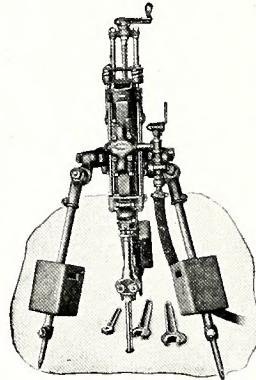
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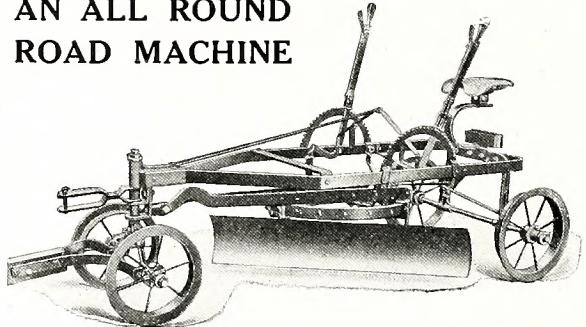
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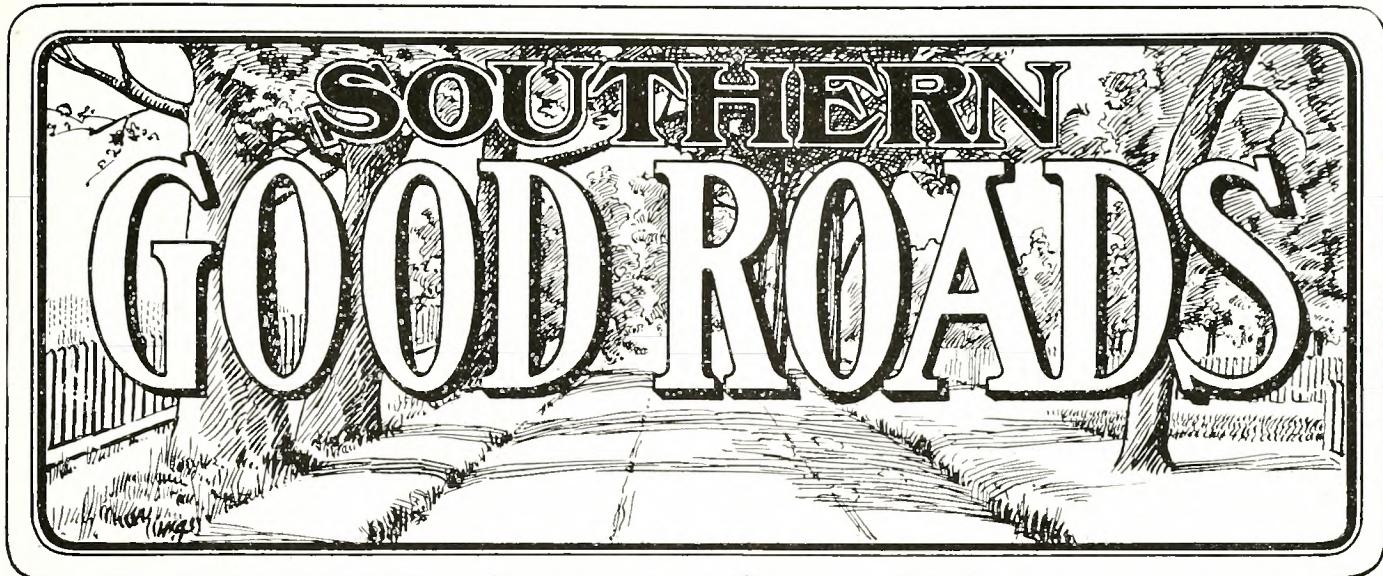
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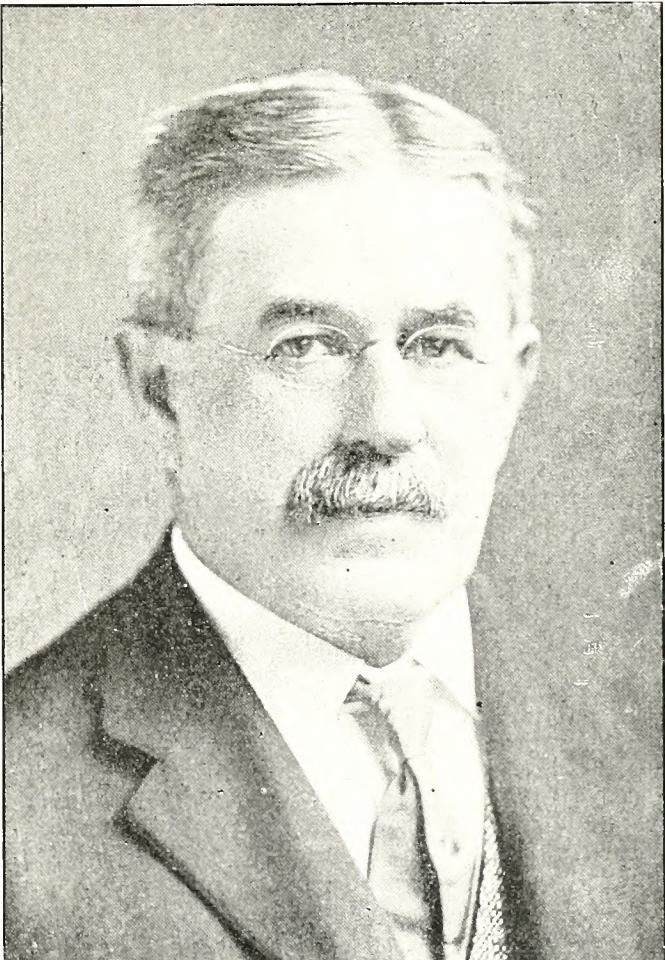
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The Economic Value of Good Roads

By HON. L. E. JOHNSON, President Norfolk & Western Railway Company, Roanoke, Virginia

The means of transportation in the most economical way is a subject that has been made a study of and has concerned the people of the world for many centuries, and the subject is as important today as it ever has been. Transportation by any means, whether by land or water, animal, electric, gasoline, or steam power (and in fact we seem to be in an era of looking forward to transportation in the air) should and must be considered, dealt with and worked out from the point of results to be obtained morally, physically and financially. May we not reasonably assume that because of the advanced opportunities for the moving of people, of the products of the soil, and of the factories by steam and electricity by land and water, that we have lost sight of the necessity of economical conveyance to the main arteries of transportation of people and their products between the Atlantic and the Pacific oceans and between the northern boundaries of Canada and the Gulf of Mexico? The question that interests you gentlemen and the question that, in my opinion, is one that you yourselves must solve, namely, what does it cost you to haul the products of your farm and your factories to the great arteries of the means of transportation to your markets?

Gentlemen, much information is at your command regarding the cost of transportation of products of the soil and the factory to the railroads which in turn transport your products to the markets, and I urge upon you the importance of a comprehensive study of this important—to you most important—question. Do you avail yourselves of the opportunities that the federal government and the state governments open up to you, as to what the cost of transportation represents in dollars and cents? Do you know that it is susceptible of proof and can be easily demonstrated to your satisfaction that more than forty millions of dollars is wasted on the public roads of the United States year



HON. L. E. JOHNSON

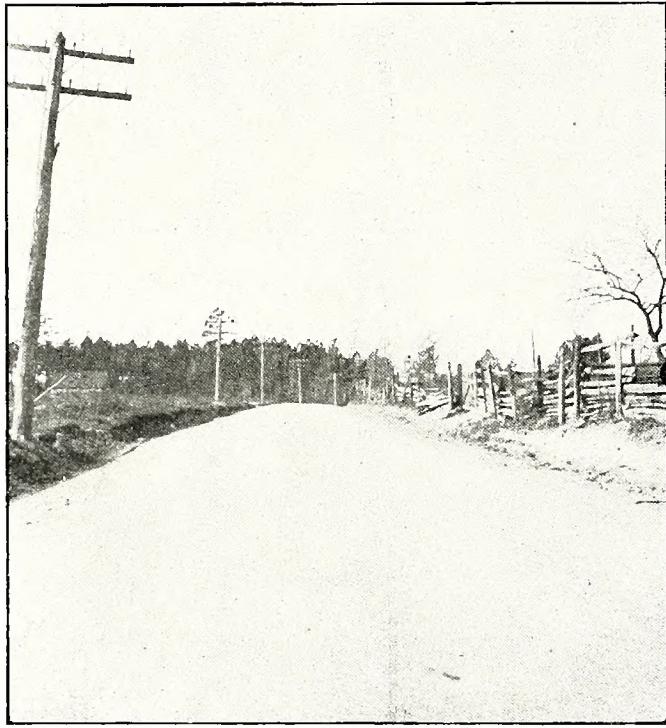
President Norfolk & Western Railway Company, One of the South's Ablest
Good Roads Advocates.

ly through ignorance, incompetence, and worse than all—indifference? You gentlemen who are here assembled representing the Southern Appalachian Good Roads Association, are paying your full proportion of this waste, due not to ignorance, not to incompetency, but almost wholly to indifference. We are informed that the annual loss due to incorrect and inadequate methods in the construction, maintenance and administration of public roads can safely be set down as forty millions of dollars thrown away—yes, worse than thrown away. If this whole forty millions of dollars was dumped in one bunch with a weight that would carry it to the bottom of the Atlantic Ocean, it would be better than to have this waste constantly appearing before the people of this country and the knowledge that their money has been expended and that they have received little or no returns therefrom.

Let us go a little farther in this matter. I do not ask you to take my word for the statements that I am making, but go yourself or send to the seat of your own government either at Washington or to your state

that you determine the aggregate weight of the crops of all characters, including the products of the forests and mines hauled to market annually in your county, determine the average haul and average cost; and from that information you will be able to make a calculation as to what the cost would be with good, well-constructed, and well-maintained roads. You will find, upon investigation, that the average haul in the United States of the products of the soil and the mines to the railroads, is an average of 9.4 miles, while one railroad (the Norfolk & Western) hauls the freight it transports an average of 263.2 miles. The average rate received by railroads of the United States for the last fiscal year was practically one cent per ton hauled one mile, while the cost to the producer to bring his products from the farm and from the factory to the railroads the average distance of 9.4 miles, was 23 cents per ton hauled one mile. Can this be reduced? In answer to that question we must look to what older countries have done in this direction, comparing those of Europe, where good roads, well-constructed and well-maintained, are the rule rather than the exception, and we find that the cost of hauling in those countries is less than half what it is in ours. Hauling on the famous highways of France costs but ten cents per ton per mile; in England the same; Belgium reduces this rate half a cent and Germany caps the climax with $8\frac{1}{2}$ cents per ton per mile for transportation on her highways. Is it unreasonable, therefore, that we assume that with a high-grade class of highways in the section of the country which you gentlemen represent, that the cost of hauling to the point of railroad transportation might well be reduced one-half at least, and if this were done, it is susceptible of demonstration as to whether it would be to your interest to provide the means by the issuing of bonds for the purpose of improving your roads. We cannot treat this question sentimentally except to a degree, and I shall touch upon that feature of the question a little later on, but for the moment I am dealing with the question purely from the standpoint of financial returns. Therefore, if you can reduce the cost, which I have stated to you is 23 cents per ton per mile, and the cost of transportation from the farm to the railroad station reaches \$250,000,000.00, and the waste of \$40,000,000.00—if you can reduce this a reasonable amount, is it not to your interest, purely from a monetary standpoint, to provide the means by a bond issue or otherwise, to build certain portions of highways in your respective counties, districts and through portions of your state that will ultimately return to you over and over and over again the interest that you have to pay upon these bonds?

It is claimed by some that as a conservative business proposition the "Pay-as-you-go" theory is fundamentally sound. If it were possible to conduct our business on the "Pay-as-you-go" theory I would not question the fundamental soundness; but, gentlemen, I invite your thought to the fact that the whole structure of our industrial and governmental fabric rests upon the mechanism of credit. The amount of legal tender actually in circulation in the United States, as given out by the Census Bureau, is only \$34.52 per capita and would be pitifully inadequate to meet the demands of business if all transactions were conducted on a cash basis. The building of our great railroads, the financing of our War of Independence and subsequent conflicts have been conducted through the powerful agency of credit. Our entire banking system, involving \$1,853,834,000.00, rests upon the foundation stone of credit. Would the advocate of the



Gravel Road Near Emporia, Virginia

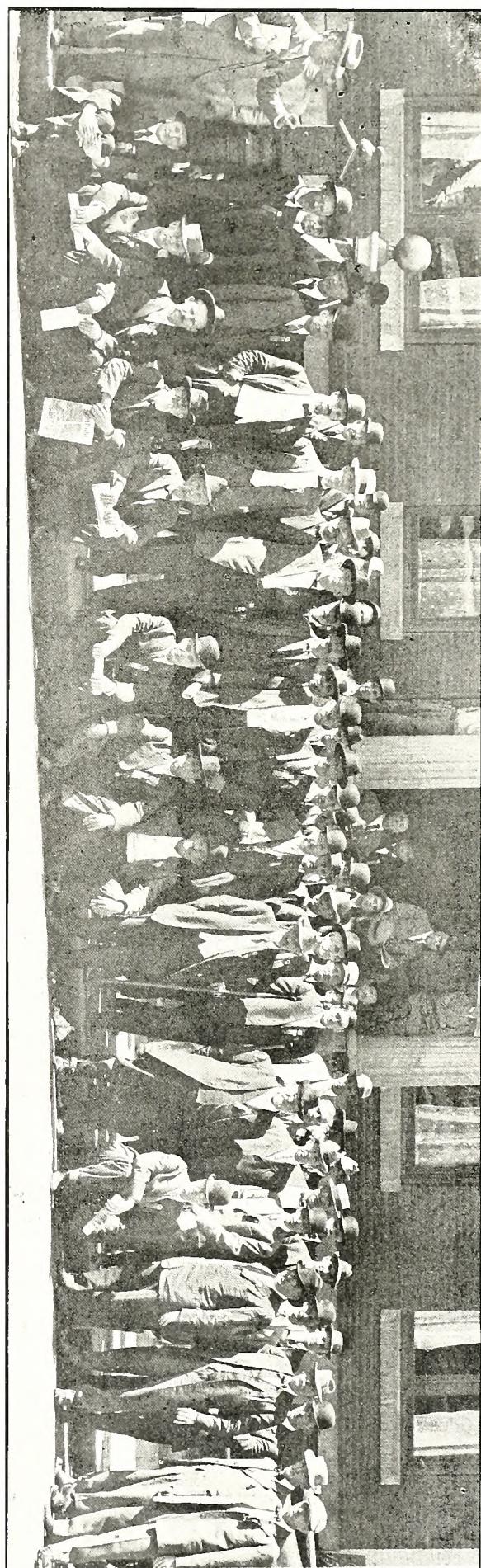
"Pay-as-you-go" theory advise a thrifty young farmer to refrain from buying a farm because he had not the entire purchase price in cash? Would it ever have been possible for the large domains of the early landed proprietors to be divided up into small farms if the practice of partial payments had not been introduced? Do you think that a man who owns an unimproved piece of city property and pays taxes upon it, should hold it as an unproductive property, rather than borrow money with which to put up buildings which would yield him a return over and above his outlay? The only examples of fortunes accumulated by the "Pay-as-you-go" plan, are those of the miser who hoards his gold, and thus demoralizes the legitimate channels of business by withholding from it a medium of exchange. It is sometimes claimed that it would not be just or equitable for a county to vote bonds on which the entire population would have to pay interest, while only a few of the localities would receive the benefits. It might just as equitably be claimed, and with as much force, that the National Government should not improve the harbors of Boston, New York, Norfolk and New Orleans, because some of the people in the United States live elsewhere. It might just as well be said that the people of the county should not be taxed to build the county courthouse, because all of the people do not engage in litigation, or that the only residents of cities who should be taxed for a fire department are those whose houses catch on fire. If the bond issue were sufficient to improve the main roads of a county, the people who live on those roads would pay proportionately a much larger percentage of the tax, because their property would increase in value to a far greater degree than the property of the people who live remote from the improved roads, and thus the burden would be automatically adjusted. We cannot expect to devise a system which would not be susceptible of some criticism as not being absolutely perfect, but "The Greatest Good to the Greatest Number" is a safe plan of procedure. Further, as only the heavy traffic roads should be improved, they would necessarily serve the most thickly populated part of the county and, therefore, benefit the majority of the people.

I have heard it stated that in some sections, at the rate of taxes, there are many farmers who find it difficult to get a sufficient amount of money together to pay their taxes. Please bear in mind that I do not make this statement as one of fact. I hope that it is not so; but assuming that it is, a tax for road improvement is an investment and not a loss and the direct returns to the farmer will be many times the tax. The increase in farm values as the result of road improvement is so great that the tax rate is frequently lower than before the issuance of bonds. To substantiate this point, I give you the following examples quoted from the experiences of two New Jersey counties:

"Essex county, though only 12 miles square, has built more than 200 miles of fine Telford and macadam roads. Essex county has borrowed \$445,000 at 4 per cent on 5-20 bonds and covered the county with a complete system of Telford and macadam roads. With the interest of the bonds added to the annual tax levy, the rate of taxation is lower than before the building of the roads, and the value of the property along the roads has increased 30 per cent to 50 per cent.

"Union county, New Jersey, spent over \$400,000 on macadam roads about 1893. The opposition claimed that the county would be ruined and farms sold to pay

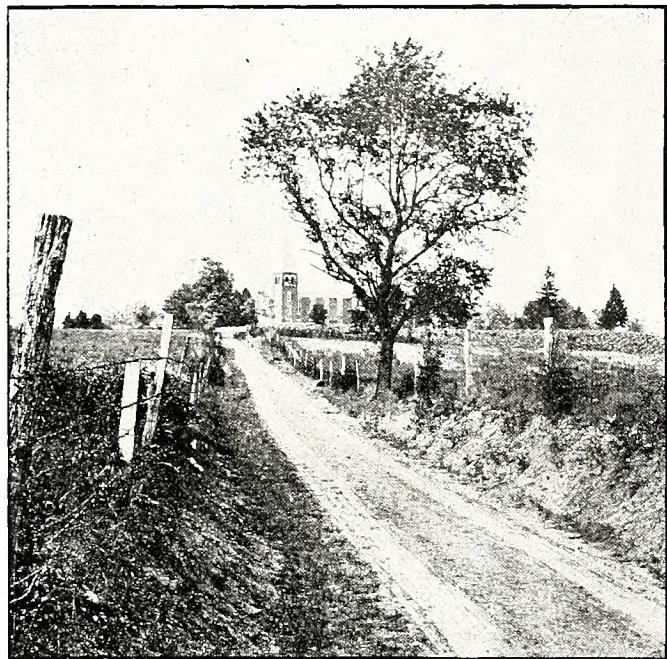
Southern Appalachian Good Roads Convention Delegates at Roanoke, Virginia, October 4th and 5th



taxes; that farmers and real estate owners would be driven into bankruptcy; that the whole project was unsound or crazy.

"On the other hand, the value of property has greatly enhanced—increased valuation being so great that the tax rate in the country districts is much less than in adjoining counties where good roads were not built. Good roads mean smaller farms, more people and less taxes."

Let us see if we can determine from information obtainable and open to you all, what effect the building of good roads may have. In the Census Reports of 1900 it was stated that there were 17,000 abandoned farms in the state of New York, and some of them were situated in the celebrated Mohawk Valley. Fix these dates clearly in your mind. 1900 is the Census Report referred to. New York adopted its first state-aid law in 1898 and when the census of 1900 was taken, the building of the state-aid roads had just begun. The law authorizing the issuance of \$50,000,000 in state bonds was not passed until 1906, therefore it is



Earth Road, Lovettsville, Virginia

only within the past six years that New York has made any great progress in the building of improved roads, as shown by the fact that in 1904 only 7.96 per cent of the roads were improved, while in 1909 sixteen per cent were improved. Bulletin No. 16 of the New York State Department of Agriculture gives the total list of farms unoccupied, for sale or rent, in the state as 975. Some cause has been effective in reducing the number of abandoned farms from 17,000 to 975, from 1900 to 1910. This fact is further substantiated and emphasized by the announcement, which is a matter of record, that in 1890 farm values in Massachusetts were depreciating, and that about that time the problem became so serious as to cause the creation of an Abandoned Farms Commission by the state legislature. Massachusetts enacted its state-aid road law in 1892, and between that period and 1900, a great many miles of excellent roads were built. In 1900, the census report showed that Massachusetts led every state in the union in the percentage of increase in farm values; while, in 1910, Mr. Harold Parker, Chairman of the

Massachusetts Highway Commission, stated that to his knowledge not a single abandoned farm existed in the state.

A very important point to consider is that of obtaining federal and state aid. In this connection, if you have not done so, I suggest that you obtain a copy of the speech of Hon. Claude A. Swanson, one of the senators from Virginia, in the senate of the United States on Friday, July 7th, 1911, in advocacy of senate bill No. 2935, introduced by him, appropriating \$20,000,000.00 annually for five years to aid the states and local communities in the improvement of public roads. It is good reading. At the present time there is a very considerable amount of money available to the different counties providing roads are built conforming to state standards of construction. You will find that conservative advocates of bond issues for road improvement confine their advocacy to the improvement of main roads by bond issues and not the improvement of the entire road mileage. It would be just as absurd for a county to build all of its roads equally as good as for a railroad to construct and maintain all of its branch lines and sidings on the same standard as its main line. For the reason that improved roads properly constructed and properly maintained benefit all interests in the county, all interests should help to pay the cost. A county bond issue levies the cost upon the towns as well as the farms, and thus relieves the farmer of part of the burden which he now bears under the old district road tax system. A bond issue is not an unjust burden on posterity, because through the increase in the value of land, the development of agricultural resources—and consequently the general prosperity—posterity is benefitted; therefore the son who inherits the wealth thus produced by the preceding generation, should certainly help pay the cost of the factors which were instrumental in bringing about this prosperity. A tax which will yield no monetary return, might, if pushed to excess, become a burden upon the taxpayer. On the other hand, a tax which is levied for the purpose of developing resources hitherto undeveloped, which development would add to the people's wealth, cannot be considered a burden in any respect, but should be looked upon as an investment.

My friends, I believe that we are entering upon a new era, and that road construction and maintenance will be largely increased in the near future and continue to grow in a manner commensurate with the requirements of the people. I have already referred to the federal government and the state governments. They are taking an interest in the matter of improvements of roads, and with the proper effort on the part of the free-holders of your county, wherever it may be, and the proper effort on the part of leaders in civic improvements, and in fact with the proper effort of all, from whatever county and whatever state you may come, aid from both the United States and your own state can and will be obtained.

There is nothing which concerns the people of this country today more seriously than the lack of soil cultivation—greater and better cultivation in order to get better returns. Young people have been drifting to the cities, immigrants from other countries remain in the cities to a large extent, and we are facing a serious condition if something be not done to change this condition. The tendency should be to the fields instead of the city and the first step in the accomplishment of this absolute necessity is the building and maintaining of good roads. They will make the life of people



Greenville, South Carolina. Showing Comparison of Wear Between Bituminous and Straight Macadam,
Built by Office of Public Roads, Two Years Ago.

living in the country more comfortable. There are over 400,000,000 acres of uncultivated land in the United States. Further than this, I think it is safe to say that half of the land now under cultivation is not producing an adequate return. If we provide a system of good roads to serve as feeders to the railroads and other means of rapid transit, we shall aid materially in making productive the millions of acres of unproductive land, and in bringing about more thorough cultivation of the land already under cultivation.

I am persuaded that a great waste of money is constantly being made by too much land being occupied for highway purposes and the amount of ground wasted in this manner is entirely unnecessary and results in great loss to the communities. The average highway is 66 feet wide, and only a small part of this space is actually needed for a roadway, the rest being devoted to weed culture. These weeds furnish an inexhaustible supply of seeds with which adjacent farms are stocked without effort on the part of their owners, causing either a heavy outlay for labor to keep the weeds down or a still greater loss from damaged crops. Gentlemen, I want to suggest for your consideration, and I want you to consider it carefully, whether or not you should continue this waste of land, this growing of seed to crop the adjacent properties with weeds which injure the crop that is being raised. Why should there be 66 feet except where it is necessary to have a greater width, on account of cuts and fills, of more than 30 feet? What do you gain, or rather what do you lose, by having 66 feet of ground for the use of the public highway when less than half that amount is sufficient. I wish I knew and wish I were able to tell

you the number of miles of public highways there are within the section of country that you represent that are 66 feet wide which might just as well be 30 feet wide, and how much saving of tillable land this would represent and what the crops obtained from that additional width of land for these many miles would represent. It would be something overwhelming. Why should we waste this land? Many notes of warning have been sounded as to the want of land throughout our whole country. In some of these warnings I agree with the parties that have made them; to others I take exception. I am optimistic enough to state without fear of proof to the contrary, that we are in no danger as to the want of land for cultivation. We have not yet reached the danger-point of lack of soil for cultivation, but we are in danger—indeed, we are in great danger—of wasting too much of our soil which is susceptible of cultivation and susceptible of the production of a crop which would bring a profitable return to the producer. We are inviting the people of the world to come to this country, we are inviting them from countries which have studied the problem of transportation from the farm to the railroads or to the water carriers, and it is up to us to show them that the conditions of this country can be brought to as good a condition as of the country from which they come. My friends, you represent a section of the country that is adjacent to the great markets of the world, aye, to the greatest markets of the world, and why should you let the opportunities that you have drift away from you? You have the soil, the climate, and it is for you to make the conditions attractive to those who are looking forward to making a living by soil cultivation.

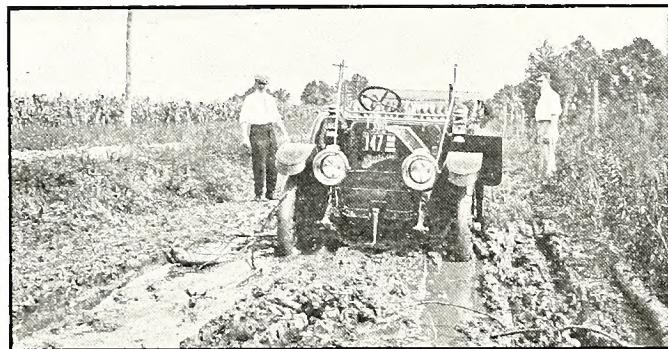
saving money and putting themselves in an independent position so far as livelihood is concerned, for themselves and their families; to make the conditions in your section of the country as good as they are anywhere in the world. The one great factor that enters into the question of good roads well constructed and well maintained—see here, my friends, I do not want you to lose sight of that word maintained. I do not advocate that you spend your money to construct a road and then let it go; a highway is not different in the results to be obtained to the railroad or water carriers, you have got to maintain it or your money has been wasted—again, there is another factor that enters into the question of good roads and which is, as a matter of fact, of the utmost importance, namely, the inability of the farmer, on account of impassable roads to haul his crops to the markets when prices are highest. In a paper read by Mr. Page before the American Roadbuilders' Association at Indianapolis last December, he bruised the pocket nerves of every farmer in Indiana by reminding them that in 1909 prices of wheat in Chicago ranged from 99½ cents to \$1.60 per bushel, the lowest price being reached in August when the roads were at their best, while the top prices were attained when the roads were practically impassable; thereby demonstrating that if the roads had been in a condition all the time to have han-

sake, be given an opportunity to work. They are not only benefitted physically but mentally and morally. Nothing is more offensive to my mind than the thought of confining in a large body the criminals of our states of all ages, the older and hardened criminals being brought into contact with the younger ones, whose minds are susceptible of receiving good or evil influences. For humanity's sake and for economic business reasons the Southern Appalachian Good Roads Association should lend its influence and work to the end of raising funds by bonds or otherwise, and using the able-bodied criminals for the construction of roads through your communities. Leaving aside all other reasons we have given above, this one alone is a sufficient reason why every qualified voter who has in the slightest degree the interest of his fellow man at heart, should cast his vote and use his influence in favor of the construction of good roads. It is easy enough to say that criminals should be punished, but we, who are law-abiding citizens, do not know the reasons that men and women disregard the laws.

In conclusion, I warn you that as much harm would be done and as great a mistake would be made to acquire the funds for the construction of good roads unless they are properly maintained, as it is possible to conceive of. A public highway, as a means of transportation, is similar in character to a steam or electric railway, and every person in this audience knows that steam and electric railways must be maintained in order that they may transport people and goods safely and expeditiously. You who have the supervision and in whose charge has been placed by your constituents the authority to construct roads, are unworthy of your trust if you do not, after the roads have been constructed, constantly maintain them—aye, in fact, constantly improve them. The construction in the first place should be done along proper lines; uniformity of grades is of the utmost importance. It is not fair to the taxpayers to construct a stretch of road fifteen, twenty, twenty-five or even more miles in length and have some one grade heavier than the average grade throughout the whole distance. It is true that all sections cannot build on the same grade basis. The lowest possible maximum should be arrived at and maintained throughout the entire distance so that when coming on to the improved road at the extreme end or at any point thereof, the teamster is assured that he can haul his full load from where he strikes the improved road to his point of destination.

In the maintenance of roads the most important feature, and in fact the fundamental principle of proper maintenance, is drainage, both cross and side drainage. It is an old adage that "a stitch in time saves nine," and this can be well applied to the maintaining of highways. When, from any cause, the road becomes broken in a spot, that spot should be repaired immediately, and it would be far less expense to the taxpayers to do this continuously than to let the road, which large sums of money have been spent to build, deteriorate and go to pieces. This is the secret of the good roads in European countries and in Massachusetts. I have traveled a great deal in Massachusetts and know whereof I speak. The roads are maintained.

Gentlemen, I thank you for the privilege that you have given me of addressing you, recognizing that I have taken up a great deal of your time to, in a measure, hash over this subject to a considerable extent. I appreciate your courteous attention to my remarks and I trust that this convention will result in great benefit to the states that you represent.



Fairfax, Va. Auto stalled in mud had to put on chains in order to get out

ed the products to the markets they could have obtained, if not the highest prices, a price much higher than the lowest. Therefore, from a monetary and economic basis good roads are a necessity.

Aside from the question of money is the isolation imposed by bad roads. Churches, entertainments and agreeable neighbors count for naught if one is separated from them by a mile or two of impassable mud holes. Good roads mean more to the children than to the grown members of the farmer's family, for they may spell the difference between an education and the lack of one. It is found that in communities provided with good roads the average school attendance the year round is over 80 per cent, while with bad roads the attendance rarely exceeds 70 per cent, while it may be as low as 30 per cent. The best schools—the kind that you desire to send your children to and the kind that your children desire to attend—are invariably located on good roads, while the class of schools that you do not desire to send your children to and they do not desire to attend, are invariably located on bad roads.

And again, each state has its full quota of criminals confined in our State Prisons and our county and municipal jails, and every able-bodied man and woman, who, for a violation of our laws, is sentenced to our prisons, should, if for no other reason than humanity's

Third Annual Convention of the Southern Appalachian Good Roads Association

By DR. JOSEPH HYDE PRATT, President Southern Appalachian Good Roads Association

One characteristic thing that is very noticeable about the conventions of the Southern Appalachian Good Roads Association is the spirit of enthusiasm that pervades the meetings; and this was very pronounced at the convention held at Roanoke, Va., on Wednesday and Thursday, October 4th and 5th, 1911. Of the seven states, Virginia, North Carolina, South Carolina, Georgia, Tennessee, Kentucky, and West Virginia, all but Kentucky had representatives present at the convention.

Arrangements for the convention at Roanoke were made by the Chamber of Commerce, which appointed the following men as a working committee: Messrs. C. Edwin Michael, President of the Chamber of Commerce, W. L. Shafer, Secretary of the Chamber of Commerce, L. C. Stewart, C. M. Arnes, E. S. Green, D. M. Taylor, H. N. Dyer, W. P. Crumpacker, Jas. F. Lee, W. S. Battle, Jr., Jos. T. Egleby, E. B. Fishburn, D. D. Hull, Jr., and C. R. Williams. To this committee the success of the convention is largely due.

Morning Session, Oct. 4.

The opening session of the convention was called to order by its President, Joseph Hyde Pratt, at 10:30 o'clock in the auditorium of the Central Y. M. C. A. The convention hall began to fill with delegates an hour before the meeting began and the visitors occupied the interim in getting acquainted with each other and with the numerous Roanokers who were on hand to welcome them and make them feel at home in the Magic City. The Rev. T. O. Keister, D. D., pastor of St. Mark's Lutheran church, opened the proceedings with prayer, invoking the blessings of the Almighty on the deliberations of the body.

The president then introduced Hon. P. St. J. Wilson, Highway Commissioner, who made the address of welcome on behalf of the State of Virginia. It was very appropriate that the man who is at the head of good roads in Virginia should be the one to welcome to his state the good road workers from other states. Mr. Wilson extended a most cordial welcome to the delegates and said that Virginia was always ready to open her arms to the citizens of her sister states. He reviewed briefly the improvement that was being made on the Virginia roads and stated that it is going on steadily and with marked progress.

On behalf of the City of Roanoke, the address of welcome was made by Hon. C. Edwin Michael, President of the Chamber of Commerce, a man who represents the progressive spirit of the city of Roanoke and also a live Chamber of Commerce, which is doing so much to build up and encourage the construction of good roads.

Responses to the address of welcome on behalf of the states were made as follows:

For South Carolina the address was made by Mr. John Wood, Secretary of the Spartanburg (S. C.) Chamber of Commerce.

On behalf of North Carolina the response was delivered by Mr. H. W. Plummer, President of the Board of Trade of Asheville, N. C.

For the state of Tennessee the response was made by Mr. Cyrus Kehr, who was introduced by the president as one of the men that the Asheville Convention of the Southern Appalachian Good Roads Association had made a most earnest supporter and advocate of good roads, and who went home to arouse his people and succeeded in organizing the Knox County Good Roads and Park Association.

Mr. Chas. P. Light responded in behalf of West Virginia.

For Georgia the response was made by Prof. T. P. Branch, of the Georgia School of Technology, who after expressing his appreciation of the cordial welcome extended to the delegates gave briefly but very interestingly an account of the good road work that was being done in Georgia.

At the conclusion of the responses to the address of welcome, the president made a brief report of the



Earth Road Near Rice Creek, Palatka, Fla.

work of the association for the past year. He stated that the work done by the association was principally along three lines: 1st, Sending out men to make addresses on good roads in different parts of the states embraced by the Southern Appalachian Association; 2nd, assisting colleges and universities in these states to establish departments in road engineering; 3rd, Assisting in the organization of state and county good roads associations.

Following the report of the President, the Secretary and Treasurer's reports were read and approved.

The President appointed the following committees:

Nominations—F. Stikeleather, Chairman, North Carolina; E. F. Lipscomb, South Carolina; Chas. P. Light, Washington, D. C.; J. A. Summers, Tennessee; Cyrus Kehr, Tennessee; T. P. Branch, Georgia; S. W. Buddleston, Virginia.

Resolutions—John Wood, Chairman, South Carolina; H. E. Waernieke, Southern Railway, Washington, D. C.; R. W. Vincent, managing editor of the Charlotte Observer, North Carolina; P. St. J. Wilson, Virginia; E. J. Watson, South Carolina; O. L. Omondro, Tennessee.

Membership—H. B. Varner, North Carolina; S. H. Webb, North Carolina; H. Hoentl, Roanoke, Virginia.

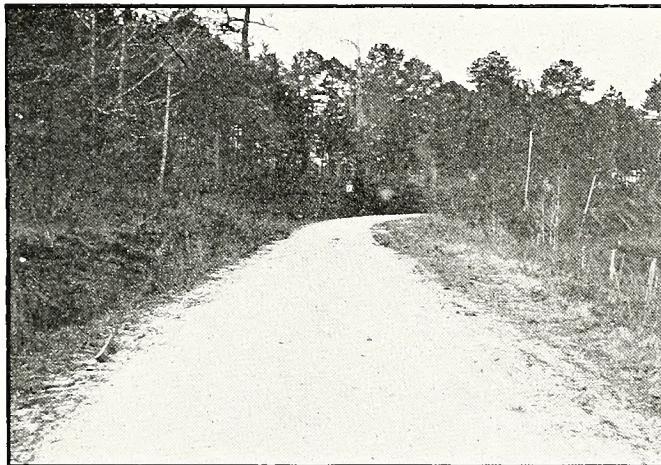
Publicity—C. E. Michael, Roanoke, Virginia; J. C. Foushee, Jr., North Carolina; C. B. Scott, Virginia; W. H. Aston, Virginia.

Very interesting reports were made regarding the work of the various State Good Roads Associations, and some of these reports will be published in full in the journal, as only brief mention can be made of them here.

Judge H. R. Starbuck of Winston-Salem, President of the Roanoke and Yadkin Valley Good Roads Association, called particular attention to the need of counties employing competent engineers to supervise the location, construction and maintenance of their roads. He also called attention to the need of maintenance of our roads.

In the absence of Mr. Hale, President of the East Tennessee Good Roads Association, Mr. J. H. Fisher reported for this association. He outlined what work his association was doing and called attention to the need of county organizations to obtain the best results.

Just before adjournment of the morning session the president called the attention of the delegates to the fact that there were representatives from many



Snow Hill, Alabama. Twelve foot macadam road, built under the supervision of United States Engineers.

manufacturers of road machinery and supplies, who would be glad to discuss road questions with them. The following companies were represented: W. C. Shanafelt, Vice-President and General Manager, Concrete Form and Engine Co., Detroit, Michigan; Geo. M. Moore, Robeson Process Co., Au Sable Forks, New York; E. J. Devine, Barrett Manufacturing Company, New York City; W. S. Godwin, Barber Asphalt Paving Co., Philadelphia, Pennsylvania; Virginia Bridge and Iron Company, Roanoke, Va.; C. M. Scott, the Good Roads Machinery Co., Charlotte, N. C.; A. P. Gilbert, Kelley Springfield Road Roller Co., Springfield, Ohio; W. M. Masters, Harrisonburg, Va., Geiser Manufacturing Company, Waynesboro, Pa. The magazines, Southern Good Roads, of Lexington, North Carolina, and Good Roads of New York were also represented.

At 1 o'clock a recess was taken until 3:00 o'clock.

Afternoon Session, Oct. 4th.

The afternoon session of the convention was called to order by the president at 3:10 o'clock.

The first speaker was Mr. L. E. Boykin of the U. S. Office of Public Roads, and in introducing him the president called particular attention to the splendid

work that the Office of Public Roads was doing throughout the country. Mr. Boykin made a splendid talk on methods of financing public road construction.

The second address at the session was an address by Hon. L. E. Johnson, President of the Norfolk and Western Railway Company, who discussed most interestingly and logically the relation of the railroads to public roads. This paper is published in full in another part of this number of Southern Good Roads.

Another interesting address at the afternoon session was by Prof. M. H. Stacy of the University of North Carolina, whose subject was "Good Roads and Schools."

The last speaker at the afternoon session was Mr. A. C. Batchelder, Chairman of the Executive Committee of the American Automobile Association. He discussed very interestingly and entertainingly the relation of the automobilist to the public road, and the plan of the American Automobile Association for extending public road construction throughout the country. Mr. Batchelder's paper will be published in full in a future issue of Southern Good Roads.

The convention adjourned at 5:00 p. m. until 10:30 o'clock Thursday morning. Wednesday evening was given up to committee meetings.

Morning Session, Oct. 5th.

The president called the second day's session of the convention to order at 10:30 o'clock and it was opened with prayer by Rev. Samuel T. Senator, Pastor of the Green Memorial M. E. Church, South.

The first part of the morning session was taken up with talks on engineering problems, which were discussed by representatives of universities and technical schools. The presence of these representatives indicated that the schools and colleges are wideawake to the value of good roads and the need of the courses of instruction in road engineering that are being given at their respective institutions.

The first address was by Dr. W. M. Thornton of the University of Virginia, who is also a member of the Virginia Highway Commission. Dr. Thornton gave a very instructive paper on County Road Construction and Maintenance. This paper will be published in full in this magazine next month.

The second paper of the morning was by Gen. E. W. Nichols, Superintendent of the Virginia Military Institute, who spoke on the subject "Good Roads: Their Economic Value." His talk was full of good points and the close attention of his audience showed their interest in his subject.

"How to Make Good Roads" was the subject of an instructive paper by Prof. T. P. Branch of the Georgia School of Technology. This paper will be published in a subsequent issue of this journal.

Regrets were received from Dr. D. H. Hill, President of the North Carolina College of Agriculture and Mechanic Arts, and Dr. P. B. Barringer, President of the Virginia Polytechnic Institute, both of whom had expected to make addresses at this point of the program.

Hon. Charles P. Light, special representative of the American Association for Highway Improvement made a very strong address on Higher Highway Education. This address was full of very interesting information and will be published in full in Southern Good Roads.

The president called Hon. P. St. J. Wilson to the chair, who stated that the time had come to hear the report of the Committee on Nominations and next meeting place. This committee reported as follows:

For President and Treasurer, Joseph Hyde Pratt, Chapel Hill, N. C.; For Secretary, H. B. Varner, Lexington, N. C.; Vice-Presidents: For Tennessee, Cyrus Kehr, Knoxville, Tenn.; For Kentucky, Joseph F. Bosworth, Middleboro, Ky.; For Virginia, J. Thompson Brown, Bedford City, Va.; For West Virginia, C. E. Krebs, Charleston, W. Va.; For Georgia, Prof. Charles M. Strahan, Athens, Ga.; For South Carolina, F. H. Hyatt, Columbia, S. C.; For North Carolina, E. C. Chambers, Asheville, N. C.

Executive Committee.

Prof. S. W. McCallie, Athens, Ga.; J. N. Fisher, Morristown, Tenn.; Dr. A. Cheatham, Durham, N. C.; John Wood, Spartanburg, S. C.; Charles P. Light, Charleston, W. Va.; Augustus P. Willson, Frankfort, Ky.; P. St. J. Wilson, Richmond, Va.; Dr. C. P. Ambler, Asheville, N. C.; Prof. Thomas P. Branch, Atlanta, Ga.; Edward F. Lipscomb, Gaffney, S. C.; The President and the Secretary.

Next Meeting Place.

For semi-annual meeting, March, 1912, Spartanburg, South Carolina.

For annual meeting, October, 1912, Atlanta, Georgia.

The committee's report regarding nominations was accepted and those recommended were duly elected.

The question of the next meeting place aroused a lively debate from those who favored Atlanta, Spartanburg, and Asheville. Eloquent talks were made by Messrs. Wood and Watson from Spartanburg, by Prof. Branch of Atlanta, and by Mr. Chambers of Asheville. A motion finally prevailed to leave the question of next meeting place to the Executive Committee.

At 12:45 o'clock the convention took a recess to 3:00 p. m.

During the noon recess the delegates were given an automobile ride over some of the good roads in the vicinity of Roanoke.

Afternoon Session, October 5th.

At 3:10 o'clock the president called to order the closing session of the convention.

South Carolina dominated this session and it was one of the best of the convention. The first speaker was Prof. F. H. Colcock of the University of South Carolina, who made a splendid talk on federal aid in road building. He was followed by Hon. E. J. Watson, Commissioner of Agriculture of South Carolina, who stirred his audience to a high pitch of enthusiasm as he discussed thoroughly and logically the economic side of good roads in connection with transportation.

At the conclusion of Mr. Watson's address, the president called upon Mr. H. E. Waernicke, who was attending the convention as a special representative of the Southern Railway. He spoke briefly of the interest of his railroad in good roads and told of the Good Roads Train that the Southern Railway was sending throughout the Southern States and what it was accomplishing.

The report of the Committee on Resolutions was then made by Mr. John Wood, Chairman. This report was accepted and the resolutions were unanimously adopted.

Resolutions

Whereas: The splendid attendance upon this convention and the encouraging reports here presented of the real and tangible progress being made emphasize

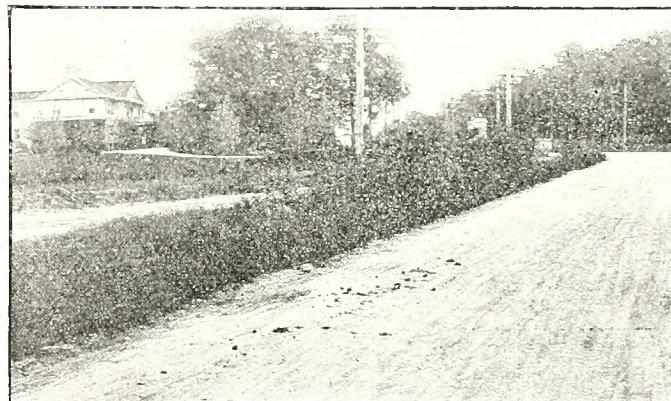
most clearly the increasing interest among the people of the Southern Appalachian territory not only in the building but in the maintenance of public highways along the most economical and permanent lines, as well as a most striking justification of the hopes and ambitions of the organizers of this association.

Therefore be it Resolved:

1st. That we most earnestly recommend a reiteration of the principles upon which this association was formed, a strict adherence to the original plans of the organization and a renewal of the enthusiastic effort that has been put forth in the successful prosecution of the work up to this time.

2nd. That the action of the Knoxville convention of 1910 in recommending the appointment of a commission to investigate the statutory road laws of the states represented in this association with a view to eradicating defects in the same, be brought again to the attention of the association and that this most important matter be furthered in every way possible.

3rd. That there may be no cessation of effort to bring about the employment of competent county



Showing the type of houses which follow the improvement of roads.
Near Atlanta, Georgia.

highway engineers and that the action of such counties as have already employed such engineers be most heartily commended.

4th. That this association notes with pleasure and encouragement the growth of sentiment, for which the association has declared, favoring federal aid in the establishment of the desired system of Appalachian roadways and of other roads in the country at large, and hereby proffers again such assistance as may be advisable to those now seeking such aid at the hands of the federal government.

5th. That this association notes with great gratification the increasing interest in courses of highway engineering study among the higher institutions of learning in our land and believes the action on the part of those institutions that have inaugurated such departments to have been among the most important, far-reaching, and valuable of any in recent years.

6th. That the valuable aid rendered and the great impetus given to highway construction and maintenance by the various railway companies traversing the Appalachian territory, through the running of splendidly equipped "good roads" trains, their expenditures of money for the services of lecturers upon all phases of road work and the public utterances of their officials whenever opportunity presented, has been watched with appreciative interest on the part of this association, and that these railways be given the cor-

dial support and assistance of this association in whatever plans they may have for furthering road building in the future.

7th. That the Southern Appalachian Good Roads Association heartily endorses the movement inaugurated at Birmingham at the National Good Roads Congress looking to the concentrating of the efforts of the various good roads organizations throughout the United States toward the securing of the active co-operation of the federal government in the building and maintenance of good roads not only by furnishing expert direction but also by undertaking the building of public highways by federal appropriations.

8th. That this association will co-operate with like existing organizations to bring about the desired result as soon as possible.

9th. That this association desires to express to the people of Roanoke through their Chamber of Commerce its sincere appreciation of the many courtesies extended the delegates to this convention and the enthusiastic co-operation given the convention in all it had planned to accomplish. The association further desires to thank the Young Men's Christian Association of Roanoke for its kindness and consideration in allowing the convention the use of its splendid hall and other conveniences.

The following resolutions were also adopted:

Resolved: That this convention appoint a committee to be composed of one member from each state comprising the association who shall co-operate with committees from other organizations in furthering the cause of good roads; and that the president shall appoint this committee as delegates or special delegates to any national road congresses or conventions that

are to take up road questions of interest to this association; and further

Resolved: That this committee shall confer with committees from the Rural Carriers Association looking toward the betterment of the roads the carriers have to travel.

The Question Box.

The most interesting and instructive time of the convention was that devoted to the Question Box, and it was the regret of all that more time could not be given to it. The following questions were asked and discussed:

Would like to know the rights of the various states to condemn right of way for road changes. Can work be started before damages are fixed?

Will the sand-clay road stand up under automobile traffic?

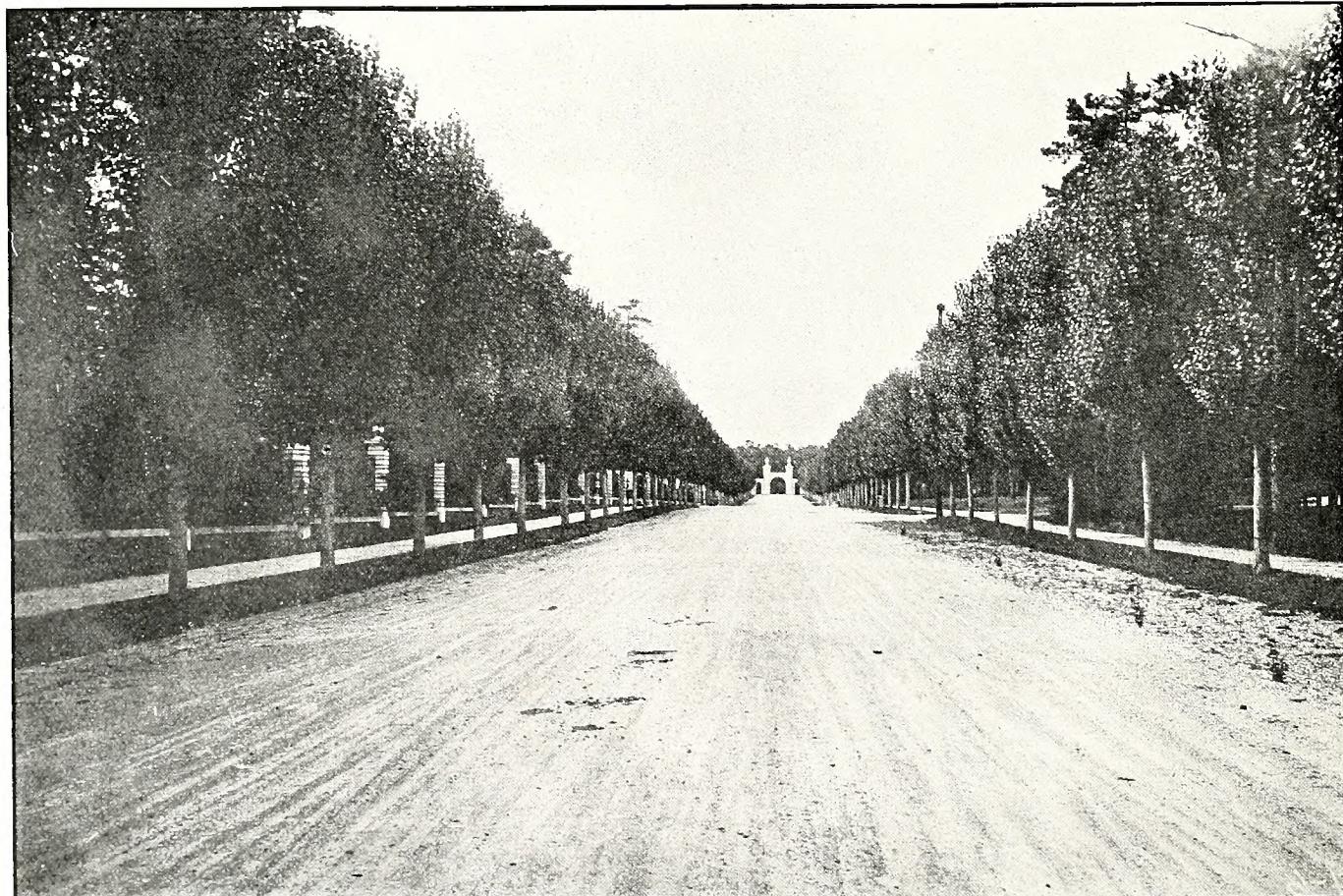
What is the best method of raising separate fund for maintenance of roads after permanent improvement?

What is the best method of maintaining roads?

What width should we make our public roads in the country?

Those leading in the discussion of these questions were W. L. Spoon, Highway Engineer of Forsyth County, N. C.; C. B. Scott, Engineer of the Virginia Highway Commission; Joseph Hyde Pratt, State Geologist of North Carolina; Prof. T. P. Branch of Georgia School of Technology; John Wood, Secretary of the Chamber of Commerce of Spartanburg, South Carolina; and H. W. Plummer, President of the Board of Trade of Asheville, North Carolina.

On motion of Mr. Cyrus Kehr of Knoxville, a rising



Macadam Road. Entrance to George Gould's Estate, Lakewood, New Jersey

vote of thanks was extended to the president for the work he had done in arranging for the convention.

A number of papers were read by titles, but will be published. These are given below.

The Progress of Good Road Improvement in Georgia; by S. W. McCallie, State Geologist.

Road Improvement in Virginia by P. St. J. Wilson, Highway Commissioner of Virginia.

Road Building Materials of Virginia by Thomas L. Watson, State Geologist.

Report of Progress of Special Highways:

Central Highway of North Carolina—H. B. Varner of North Carolina.

Salisbury-Hickory-Lenoir Highway—P. B. Beard of North Carolina.

Spartanburg-Asheville Highway—John Wood of South Carolina.

Crest of the Blue Ridge Highway—Joseph Hyde Pratt of North Carolina.

Triangular Highway—Fred N. Tate of North Carolina.

At 5:15 p. m. the convention closed sine die.

Where the Statesmen Stand on Good Roads Question

The growth of the federal aid idea among the members of congress has been noted in Southern Good Roads several times. Champ Clark, Senator Cullom, Senator Simons, Senator Swanson, Senator Bankhead and a number of other leaders of national note, have come out for national aid in road-building and their views have been aired in these columns. That the idea is gaining ground grows more apparent day by day.

Last month The Los Angeles Times, the great paper of which Gen. Harrison Gray Otis is the head, gave a symposium of the views of a score or more of congressmen, of both houses, for and against the national automobile highway which The Times is backing. A striking feature of the article is a half page collection of autographs, reproducing parts of the letters and the signatures of United States Senators and members of the house of representatives. The majority of the letters commend the idea and advocate federal aid in the building of the road.

The Indian United States Senator, Hon. R. S. Owen, writes:

"I strongly favor a national highway and I believe that the government should take part with the states in promoting good roads."

Senator Luke Lea, who was made famous by his picturesque sacrifice in an attempt to save the life of his wife by blood transfusion, writes:

"I am very much interested and will do what I can to bring this matter to the attention of the people of Tennessee."

United States Senator James E. Martin writes that a national highway "will do more to break down sectionalism, hate and prejudice than anything else. It is a stupendous project, the working out of detail demanding patriotic and unselfish action."

Senator Joseph P. Bristow writes to say that he never has investigated the idea thoroughly but that he considers it to be an "interesting idea."

Representative Stephen B. Ayres of New York writes from the standpoint of a motorist:

"I have just returned from a motor trip of 1850 miles and realize more keenly than ever before how much good roads mean to residents of the rural localities. In the State of New York we have proposed a

very extensive system of good roads and some of them are already built, others are building and many others are yet to be constructed.

"The difference in the general thriftiness of the people who live along the state highways and those who live on the little ill-kept roads, five or ten miles distant from the state highways, is very noticeable."

Senator Warren of Wyoming writes that, being keenly interested in all good roads movements, this proposition appeals to him directly and he will do anything possible to push it.

Representative Greene of Massachusetts expresses the opinion that Senator Cullom's bill does not allow enough money for so extensive an undertaking.

Driscoll of New York sees nothing in it but is willing to be convinced.

Representative Davenport of Oklahoma believes we ought to spend the money now spent on warships on this road.

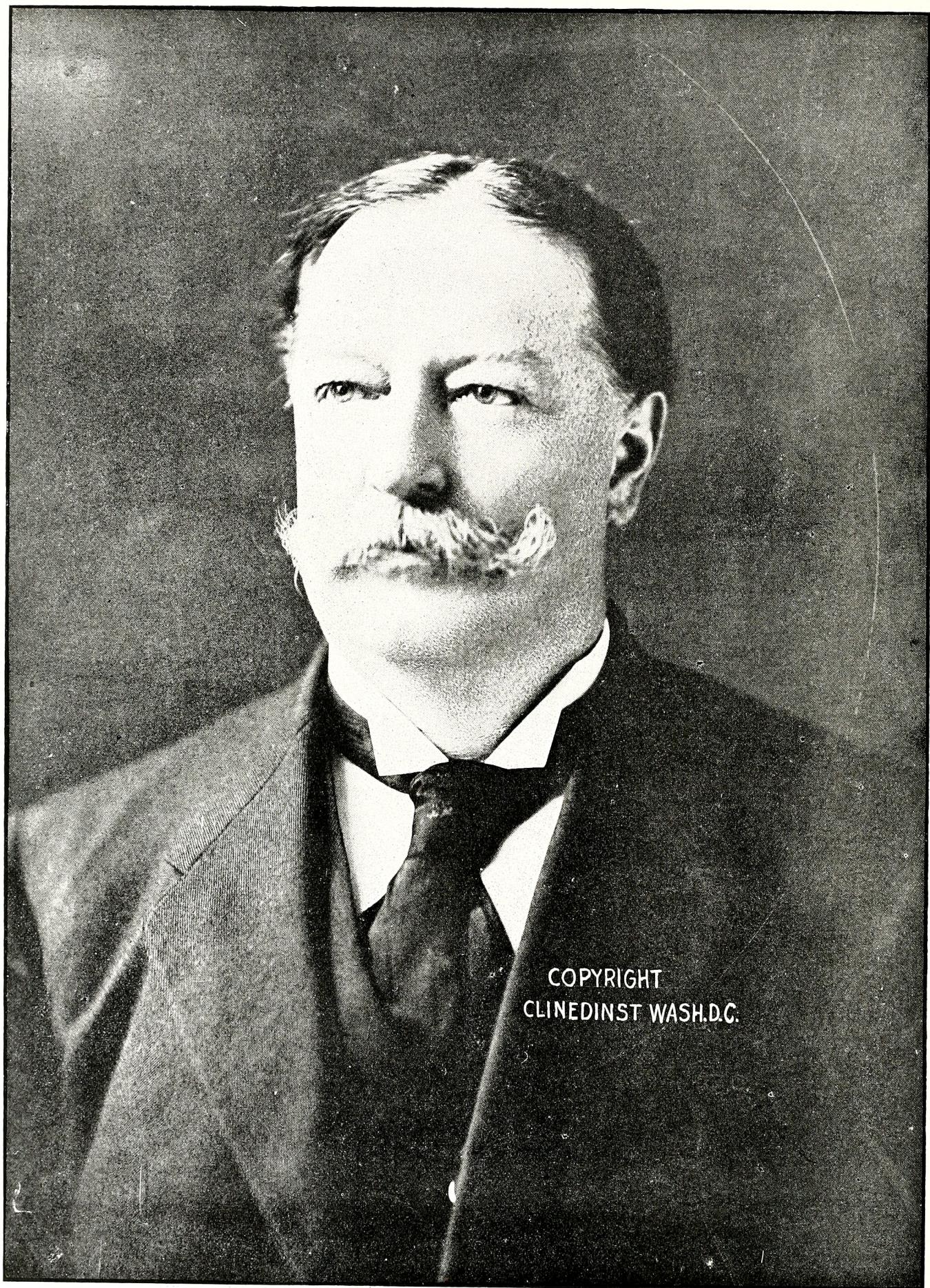
Representatives Foster of Vermont, Rees of Kansas, Fuller of Illinois, John W. Weeks of Massachusetts, John J. Escol of Wisconsin, James T. Lloyd of Missouri, Edward W. Saunders of Virginia, J. Hampton Moore of Pennsylvania, John H. Small of North Carolina, Frank Plumley of Vermont, N. H., Whigman of Pennsylvania, William C. Adamson of Georgia are all represented in The Times symposium. Most of them are in favor of a national highway. Mr. Weeks is one of those most strenuously opposed.

"Uncle Joe" Cannon, for many years the "Czar of the House," lines up with those who are "again" the project. He is in favor of good roads and he believes that the national government has a perfect right to build and maintain all of the roads in the nation, but he does not believe that Uncle Sam can afford it now. He writes:

"I do not see my way clear to advocate the improvement of highways by utilizing the Treasury of the United States. As you are aware, all public roads, streets and alleys in the United States are post roads and I take it that congress has the power to improve a portion or all of them and to maintain the same. In Illinois we have 60,000 miles of black dirt roads. We are beginning to improve them, and I trust will improve them at the expense of various townships, counties and with such aid as the state may give from the State Treasury. Among the projects most strongly referred to is the construction of a highway from Washington to Gettysburg as a memorial to Lincoln, supplemented by a highway from Washington to Richmond. Another from the lakes to New Orleans, via The Hermitage with branches to Cleveland, Toledo and Chicago. Frankly, it seems to me, with the wonderful necessary centralization of legislation and expenditure in the congress of the United States, under the Constitution, that it is not wise for congress to enter upon the construction of the highways in the United States."

Senators Lodge of Massachusetts, Smoot of Utah and Perkins of California, while not committing themselves to the national aid idea, express a great deal of interest and promise to give the matter their most careful attention.

To ship wheat from New York to Liverpool—3,100 miles—1905-6, cost 3.8 cents per bushel, or 1.6 cents less than it cost the farmer to haul it 9.4 miles from farm to railroad station.



PRESIDENT WILLIAM HOWARD TAFT
A Regular Member of the American Association For Highway Improvement, Who Will Deliver the Opening Address
at the First Convention in Richmond, Virginia, November 20th.

First Annual Road Congress of the American Association For Highway Improvement and Affiliated Organizations

To be Held in Richmond, Virginia, November 20-23, 1911

Upon invitation of the Mayor and the Chamber of Commerce of the City of Richmond, Commonwealth of Virginia, the First Annual Road Congress of the American Association for Highway Improvement and its affiliated organizations will be held in that city November 20-23, 1911.

The coming Road Congress will bring together the foremost engineers, road officials, traffic experts, legislators, railway officials, manufacturers, contractors, and agriculturists, who will devote their serious attention to the various and important problems of road construction, maintenance, and administration. In the field of road construction intricate problems have arisen in connection with the adaptation of methods of construction to meet the destructive effects of modern traffic. Road maintenance has been almost entirely neglected in the United States, with the result that deterioration of some of our best constructed roads represents a preventable loss aggregating millions of dollars annually. Just now there is a tendency toward remedial action looking to the adoption of continuous and systematic maintenance. In the field of road administration much complex, inadequate and inappropriate legislation and practice are in force. Although many wise and equitable reforms have been introduced in late years, the bulk of existing legislation embodies the same systems which were in vogue in the days of Queen Elizabeth and have long since been abandoned by the foremost nations of Europe. There are so many considerations of public welfare demanding the improvement of our country roads that concerted energetic action should no longer be delayed. The purposes for which the American Association for Highway Improvement was formed and which may be said to represent the aims and purposes of the coming Road Congress are as follows:

(1) To correlate and harmonize the efforts of all existing organizations working for road improvement.

(2) To arouse and stimulate sentiment for road improvement.

(3) To strive for wise, equitable and uniform road legislation in every state.

(4) To aid in bringing about efficient road administration in the states and their subdivisions, involving the introduction of skilled supervision and the elimination of polities from the management of the public roads.

(5) To seek continuous and systematic maintenance of all roads, the classification of all roads according to traffic requirements, payment of road taxes in cash, and adoption of the principle of state aid and state supervision.

PERSONNEL OF THE CONGRESS.

Honorary Delegates.

The President of the United States.

The Vice-President of the United States.

The Speaker of the House of Representatives.
The Cabinet.

The United States Senate and House of Representatives.

The Supreme Court of the United States.
The Representatives of Foreign Governments.
The Governors of States and Territories.



HON. LOGAN WALLER PAGE

Director United States Office of Public Roads, President of the American Association for Highway Improvement

The Lieutenant-Governors of the States and Territories.

The State Highway Officials.

Other State Officials.

The Mayors of Cities.

The Presidents of State and other Universities and Colleges.

The Officers and Members of the American Association for Highway Improvement.

The Officers and Members of the Touring Club of America.

The Representatives of the Press
Official.

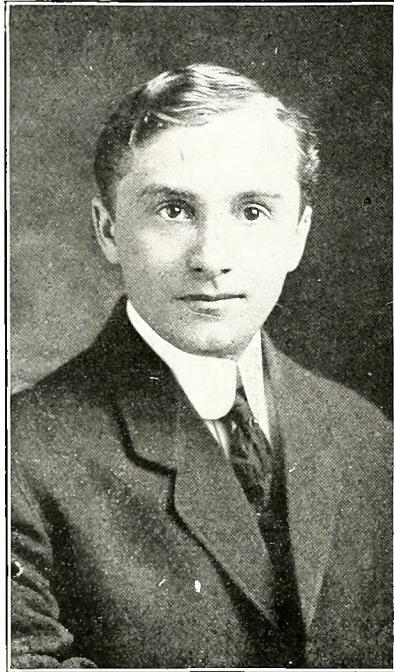
Two State Delegates from each Congressional District appointed by the Governor of each State and Territory, within which such district lies.

Three Delegates appointed by the Mayor of each City.

Five Delegates appointed by each National or Interstate Organization concerned directly or indirectly with road improvement.

Two Delegates appointed by each State or other University or College and by each Agricultural College or Experimental Station.

Three Delegates from each State Association for Highway Improvement.



HON. J. E. PENNYBACKER, JR.
Secretary American Association For Highway Improvement

Three Delegates appointed by each State Board of Trade and Chamber of Commerce.

Three Delegates appointed by each Chamber of Commerce, Board of Trade, Commercial Club, and Business Men's Association, directly concerned in the work of road improvement.

All organizations affiliated with the American Association for Highway Improvement are entitled to vote, in all matter affecting the association, on the basis of one vote for each fifty members in good standing in such affiliated organization under the conditions set forth in the Constitution and By-Laws of the American Association for Highway Improvement. This applies only to the association and not to the congress, voting privileges in the latter being restricted to delegates as above explained. A meeting of the association will be held on the fourth day of the congress for the election of officers and the consideration of all matters relating to the association.

PROGRAM.

"National Day."

The president of the United States will deliver the principal address on the opening day of the congress

which will be known as "National Day." Other distinguished men of achievement will deliver addresses on that day, among them, Governor Mann of Virginia, Senator Martin of Virginia, Dr. Walter Page, Editor of the World's Work, Mr. W. W. Finley, President Southern Railway Company, Gen. T. Coleman DuPont, who is presenting to the State of Delaware a \$2,000,000 boulevard, Hon. J. Hampton Moore, President, Atlantic Deep Waterways Association, and Hon. John H. Bankhead of Alabama. It is hoped that the British and French Ambassadors will tell the assembled delegates about the methods which are responsible for the superb roads of England and France.

"Highway Engineers and Contractors Day."

The second day of the congress will be known as "Highway Engineers and Contractors Day" and will be devoted to the practical problems of road construction and maintenance. Mr. Harold Parker, Chairman of the Massachusetts State Highway Commission, will preside. A number of the leading engineers and contractors of the United States and Canada will present twenty minute papers on the subject with which they are most familiar. Among them will be: W. A. McLean, Provincial Engineer of Ontario, Canada; W. W. Crosby, State Highway Engineer of Maryland; A. N. Johnson, State Highway Engineer of Illinois; A. H. Blanchard, Professor of Highway Engineering, Columbia University; P. St. J. Wilson, State Highway Commissioner of Virginia, and John A. MacArthur of MacArthur Brothers, New York. These papers will be followed by five minute talks by other leading engineers and contractors and the proceedings will be published later on as bulletins of the American Association for Highway Improvement.

Manufacturers Section.

At 3 o'clock on "Highway Engineers and Contractors Day" the Manufacturers of road machinery, apparatus and materials will hold a meeting for the purpose of effecting a permanent organization to co-operate with the American Association for Highway Improvement and to promote in general the progress of road improvement in the United States. It is expected that from seventy-five to one hundred of the leading manufacturers will be represented and an interesting program will be given.

"Road Users Day."

The third day of the congress will be known as "Road Users Day" and will be conducted under the auspices of the Touring Club of America. It will be devoted to a discussion of the various problems of traffic regulation not merely from the standpoint of the automobilist, but from every other standpoint. Hon. James S. Harlan, member of the Interstate Commerce Commission and a Director of the Association, will preside. The address of welcome will be delivered by Mr. Preston Belvin on behalf of the State Automobile Association and will be followed by Mr. J. T. Palmatary, President of the Richmond Automobile Club. Many distinguished speakers will present different phases of the traffic subject among whom will be: Senator Swanson of Virginia, Mr. Hugh Chalmers of Detroit, Col. Charles Clifton of New York, Mr. Howard D. Hadley of New York, and many others of note.

"Association Day."

The fourth day of the congress will be known as "Association Day" and will be devoted to the work of the American Association for Highway Improvement,

the various affiliated organizations and the great National Association indirectly concerned in the movement for road improvement. Dr. Joseph Hyde Pratt, State Geologist of North Carolina and President of the Southern Appalachian Good Roads Association, will preside. In addition to the affiliated organizations, a list of which appears elsewhere in this announcement, it is expected that representatives of such important organizations as the National Grange, Farmers Union, Automobile Association, the National Civic Federation, Mothers' Congress, the Lincoln Memorial Highway Association, and other organizations of similar standing will be heard on that day.

Touring Club of America.

Tours of automobilists are being arranged under the auspices of the Touring Club of America from all of the principal cities of the country to the Road Congress. Special route cards will be prepared by the Touring Club of America based upon information now being obtained by the official scout cars of the Club and it is expected that distinctive pennants will form an attractive and picturesque feature in connection with these tours. The Touring Club of America is actively participating in the preparation of the program for "Road Users' Day" as well as in the direction of the tours. The headquarters of the Touring Club will be at the Jefferson Hotel.

Capital Highway Association.

The Capital Highway Association, under the able leadership of Mr. Leonard Tufts, is arranging in co-operation with the Touring Club of America, tours over the Capital Highway route from Atlanta to Richmond. Mr. Tufts announces that cars will leave Atlanta in time to reach the Congress by November 19. The Association will hold its convention in the parlor of the Jefferson Hotel on the afternoon of the second day of the congress, beginning at 3 o'clock.

Quebec-Miami Road.

Following the indefatigable efforts of the advocates of a through road from New York City to Montreal the legislature of the State of New York and the provincial and local authorities of Canada have provided sufficient funds to insure the building of a splendid highway between those two cities. The project is now well under way to make this only a part of a great through highway running from Quebec to Miami, Florida. Mr. Howard D. Hadley of Plattsburg, N. Y., and Mr. George A. Simard of Montreal, Canada, being the guiding geniuses of this great enterprise. From New York to Baltimore only twelve miles of road remain to be constructed outright, while between Baltimore and Washington the boulevard is assured by reason of the fact that the Maryland legislature has provided sufficient funds. Eighteen miles of the road from Washington toward Richmond are under construction and other short stretches have been completed. South of Richmond the Capital Highway Association and the road enthusiasts of Southern Georgia and Florida have overcome most of the difficulties in securing a through road to Miami. Messrs. Hadley and Simard co-operating with the Touring Club of America, will organize tours of automobilists from Quebec, Montreal and northern New York points who will meet at Richmond the tourists coming up from Miami and southern points, and it is hoped that this will be the occasion for taking such steps as will insure the completion of this great international highway.

Lincoln Memorial Highway.

The Congress of the United States has appropriated \$2,000,000 for a memorial to Lincoln. The form of the memorial will be tentatively determined by a commission, of which the President of the United States is Chairman, Congress having the final determination in the matter. The Lincoln Memorial Highway Association is seeking to have the memorial take the form of a great highway rather than a monument or other structure, and thus provide not only a fitting tribute to the dead statesman but also a continuous utility to thousands of living Americans. Two routes are suggested for the highway, one from Washington to Get-



COL. W. C. BROWN

President New York Central Railroad Company, Vice-President American Association for Highway Improvement

tysburg and one from Washington to Richmond. At Richmond the advocates of a Lincoln Memorial Highway will be heard and the congress may be expected to take some definite action in regard to this important matter.

Richmond.

A more appropriate place than Richmond for the assembling of the first Good Roads Congress, under the auspices of the American Association for Highway Improvement, could not have been selected. The great undertaking of the Quebec-Miami Road, practically assured as far as Washington, D. C.; the project of the Capital Highway Association for a highway through the Capitals of a number of Southern States, and the suggestion that the Lincoln Memorial, provided for by a federal appropriation of \$2,000,000 shall take the form of a national highway from Washington to Gettysburg, or from Washington to Richmond, pointed to

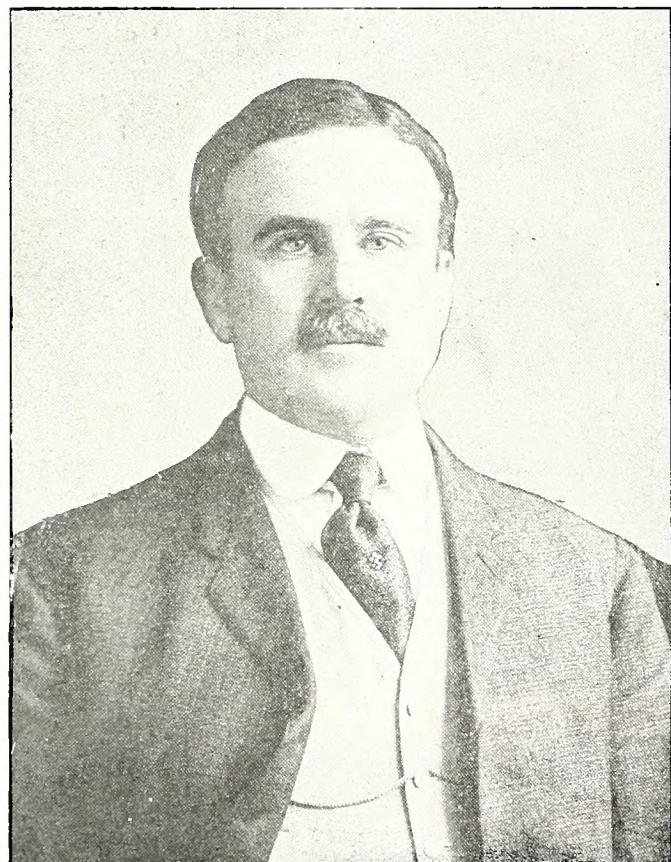
Richmond as an eminently suitable forum for the discussion and exploitation of these several projects which may become object lessons in the construction of national highways.

Being conveniently situated on the Atlantic Seaboard to the middle west; the portal through which the people of the two great eastern sections of this country, the north and south, pass in their social and commercial relations; and the border city of the south, which, it is conceded, will be the scene of unsurpassed material development in the near future, presenting the greatest field for good roads improvement, Richmond logically offers the opportunity for successfully inaugurating the propaganda of the Highway Association.

Other considerations will render Richmond a convenient and attractive city to delegates and tourists.

Good Roads Week.

Governor Mann of Virginia has issued a proclamation calling attention to the Road Congress and design-



HON. LEE MCCLUNG

Treasurer of the United States, Treasurer American Association for Highway Improvement

nating the week immediately preceding it as "Good Roads Week." He will urge in his proclamation that civic organizations, public schools, churches and all other influential agencies for the public welfare devote special attention to the subject of road improvement during that week. The governors of other states will be asked to take similar action so that throughout the entire United States an effective and impressive Good Roads Week may be held.

Entertainment.

Richmond is celebrated not only for its hospitality but for the incomparable manner in which this hospi-

tality is extended to its guests. Preparations are being made for a brilliant series of social events to occupy the evenings during the continuation of the congress. The delegates and visitors will be informed as to these features in due time.

Headquarters of the Congress.

The official headquarters of the Road Congress will be at the Jefferson Hotel on Main, Franklin and Jefferson streets, west. Delegates and visitors will find the registration room on the office floor of the hotel. The meetings of the congress will be held at the auditorium of the Jefferson Hotel.

Railroad Facilities and Rates.

The Southern Railway, the Chesapeake & Ohio Railway, the Seaboard Air Line, the Atlantic Coast Line and the Richmond, Fredericksburg & Potomac Railroad enter Richmond. Pullman and sleeping car accommodations can be secured from New York, Tampa, Miami, Atlanta, Birmingham, New Orleans, Chattanooga, Memphis, Charlotte, Asheville, Chicago, Cincinnati, St. Louis, Louisville, Indianapolis and intermediate points. There are four railroad stations in the city of Richmond, namely, Main Street Station at 15th and Main streets; Byrd Street Station at 7th and Byrd Streets; Elba Station at Broad and Pine Streets; and 14th and Cary streets. Arrangements are now under way to secure reduced round trip rates to Richmond and full information will be available several weeks in advance of the congress. Delegates and visitors should consult their local or general passenger agents for details as to routing, rates, etc., or write to the office of the American Association for Highway Improvement at Washington.

AMERICAN ASSOCIATION FOR HIGHWAY IMPROVEMENT.

Officers.

Logan Waller Page, Director, U. S. Office of Public Roads, President.

W. C. Brown, President, New York Central Lines, Vice-President.

Lee McClung, Treasurer of the United States, Treasurer.

J. E. Pennybaeker, Jr., Secretary.

Directors.

Louis W. Hill, President, Great Northern Railroad, Chairman.

L. W. Page, Director, U. S. Office of Public Roads.

B. F. Yoakum, Chairman, Frisco Lines.

Dr. E. J. James, President, University of Illinois.

James McCrea, President, Pennsylvania Railroad Company.

Bryan Lathrop, Lincoln Park Commission, Chicago, Ill.

John Goodell, Editor, Engineering Record.

Walter Page, Editor, World's Work.

Leonard Tufts, President, Capital Highway Association.

Lafayette Young, Former U. S. Senator from Iowa.

W. C. Brown, President, New York Central Lines.

John A. Stewart, President, International League for Highway Improvement.

W. W. Finley, President, Southern Railway Company.

Joseph W. Jones, of New York.

James S. Harlan, Interstate Commerce Commissioner.

Lee McClung, Treasurer of the United States.

A. G. Spalding, Member San Diego Highway Commission.

Clarence Wilson, U. S. District Attorney, Washington, D. C.

Alfred Noble, Past President, American Society of Civil Engineers.

George C. Diehl, Chairman, Good Roads Board, American Automobile Association.

J. Hampton Moore, Member of Congress from Pennsylvania.

Affiliated Organizations.

Ohio Good Roads Federation.

Western Michigan Development Bureau.

Gulf Coast Good Roads Association.

Aroostook County Good Roads Association of Maine. Montana Society of Engineers.

Arkansas Good Roads and Drainage Association.

North Carolina Good Roads Association.

Memphis-to-Bristol Highway Association.

South Carolina Good Roads Association.

International League for Highway Improvement.

Good Roads Club of Georgia.

New Santa Fe Trail Association.

Indiana Good Roads Association.

Iowa Good Roads Association.

Southern Appalachian Good Roads Association.

Central Highway Association.

Capital Highway Association.

Touring Club of America.

Tennessee Association for Highway Improvement.

Omaha-Denver Good Roads Association.

Inter-Mountain Good Roads Association.

Oregon Association for Highway Improvement.

Southeastern Kentucky Good Roads Association.

Knox County Good Roads Association.

Washington-to-Bristol Highway Association.

Mothers' Congress.

North Dakota Good Roads Association.

Virginia Road Associations.

Manufacturers Committee.

Hotel Accommodations.

Davis Hotel, Main St., between 15th and 17th, capacity 100.

The Jefferson, Main, Franklin and Jefferson Sts., capacity 700.

The Lexington, 12th and Main Sts., capacity 250.

Murphy's, Broad, Grace and 8th Sts., capacity 750.

The Richmond, 9th and Grace Sts., capacity 250.

Stumpf's (Stag), Main and 8th Sts., capacity 75.

Rates Per Day

At the Davis Hotel—J. Lee Davis, Prop.—One person, single room, \$1.00, with bath \$1.50; Two people, double room, \$2.00, with bath \$3.00.

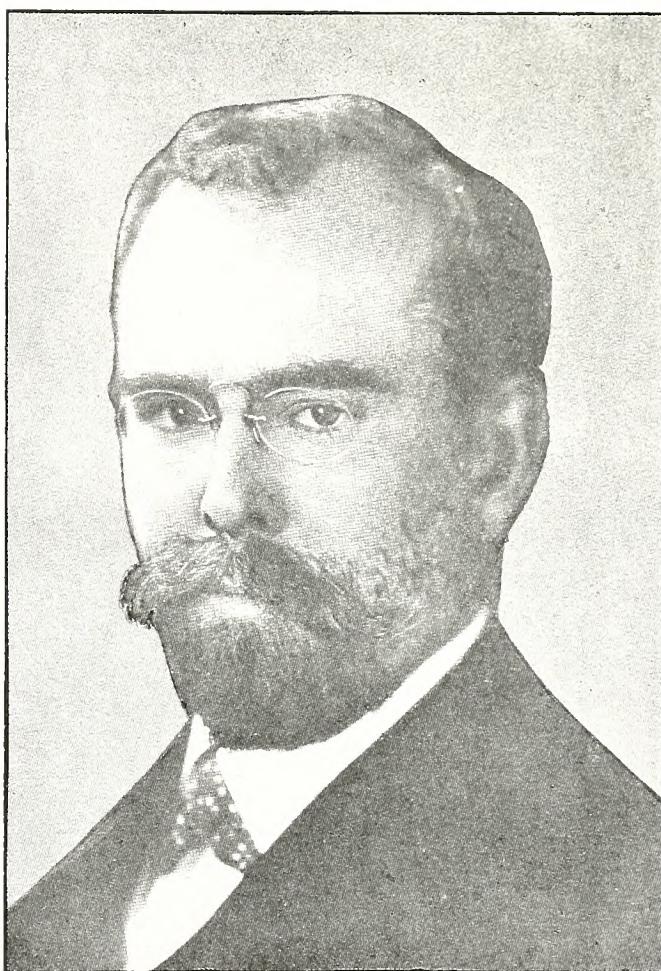
At the Jefferson—O. F. Weisiger, Manager—Single rooms, overlooking the court, one person, \$1.50; Double rooms, overlooking the court, two persons, \$3.00; Single rooms, overlooking the court, one person, with bath, \$2.50; Double rooms, overlooking the court, two persons, with bath, \$4.00; Single outside rooms, one person, \$2.00; Double outside rooms, two persons, \$4.00; Single outside rooms, one person, with bath, \$3.00; Double outside rooms, two persons, with bath, \$5.00; Larger outside rooms, two persons, bath and twin beds, \$6.00 and \$8.00.

At the Lexington—J. E. Donahue, Sec. and Treas.—American Plan—Rooms without bath, single \$3.00 and \$5.50; Rooms without bath double, \$2.50 and \$3.00; Rooms with bath, single, \$3.50 and \$4.00; Rooms with

bath, double, \$3.00 and \$4.50. European Plan.—Rooms without bath, single \$1.50 and \$2.00; Rooms without bath, double \$1.00 and 1.50; Rooms with bath, single \$2.50 and \$3.00; Rooms with bath, double \$2.00 and \$2.50.

At Murphy's—Jas. T. Disney, Mgr.—European Plan.—Single rooms without bath, one person \$1.00 to \$3.00; Single rooms with bath, one person \$3.00 to \$5.00; Double rooms without bath, two persons \$3.00 to \$5.00; Double rooms with bath, two persons \$4.00 to \$7.00.

At the Richmond—S. T. Atkinson, Mgr.—Single rooms without bath, one person, \$1.50 up; Single rooms



HON. LOUIS W. HILL

President Great Northern Railway Company, Chairman Board of Directors, American Association for Highway Improvement

with bath, one person, \$2.00 up; Double rooms without bath, two persons, \$3.00 up; Double rooms with bath, two persons, \$4.00 up.

At Hotel Stumpf—E. A. Stumpf, Mgr.—Single rooms, without bath, each person \$1.00; Rooms with bath, each person \$1.50; Double rooms, with bath, for four persons, each \$1.50.

Hotel Gilbert—Mrs. J. B. Gilbert, Prop. 801-3 E. Franklin Street. American plan, \$2.50 and up. European plan—\$1.00 and up without bath; \$1.50 and up with bath.

Information Bureau.

For the purpose of assisting delegates and visitors in securing suitable hotel accommodations, and full information concerning the Congress and the City, a bureau will be maintained in the lobby of the Jeffer-

son Hotel. At this bureau, a bulletin board will be maintained, where delegations and chairman of committees may post announcements of meetings and all other matters of importance in connection with the Congress.

To Delegates and Members.

All delegates and members will be expected to register, upon which they will receive badges, tickets of admission, program, and cards to special events. The location of registration headquarters will be on the office floor of the Jefferson Hotel and this fact will be



HON CHAS. P. LIGHT

Field Representative, American Association for Highway Improvement

further emphasized by cards posted at all railroad stations, hotels and public places.

Printed lists of members and delegates in attendance, showing local addresses, will be distributed at the opening of each session of the Congress.

Sessions of the Congress.

The Road Congress will open each day at 9:30 a. m. The afternoon sessions will begin at 3 o'clock. Special announcements will be made of entertainment features, special meetings of affiliated organizations, committees, etc.

Further Information

May be promptly obtained by writing to Mr. J. E. Pennybacker, Jr., Secretary, American Association for Highway Improvement, Colorado Building, Washington, D. C.

Hilliard, Fla., has organized a Board of Trade whose first object will be the boosting of good roads.

Does it Pay to Issue Bonds for Road Construction?

The Asheboro (N. C.) Courier recently told the following striking story of progress:

"Some years ago Guilford voted a bond issue of \$300,000.00 for good roads. Since the building of good roads the increase in population is greater in that county than in any county in the state. Ten years ago Randolph stood next to Guilford in white voting population. Now Guilford has twice the population of Randolph. A few weeks ago the people of Guilford got together to consider the question of issuing bonds for good roads. It was found that the county had a surplus of \$44,000.00 each year, after repairing the roads and paying the interest on the bonds and providing a sinking fund, and yet, the tax rate is only 79 cents on the \$100.00 valuation."

Christian County, Ky., has demonstrated conclusively that good roads cost less than bad roads. Some years ago they issued \$200,000.00 in bonds and with the proceeds constructed 150 miles of good road. There was, of course, the usual plaintive chorus from the pessimists to the effect that this huge outlay would mean bankruptcy to the county. Instead of this dire prophecy coming true, the taxes are actually lower than they were before this \$200,000.00 burden was assumed. Property values have shown material increases, business has developed, and the citizens of the county are more prosperous than ever before.

Care in Driving an Aid to Good Roads.

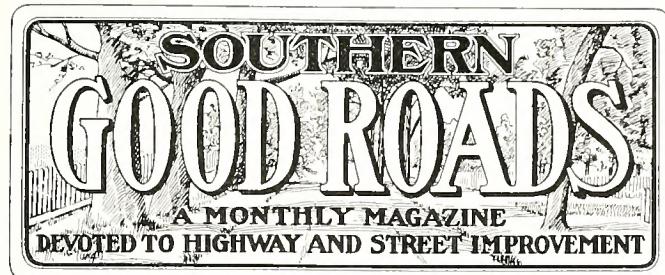
Automobilists are quick to complain about poor roads or the lack of what seems to be care in maintaining them to a proper touring standard. Yet comparatively few seem to realize that they themselves may be of great aid to the various local and state highway authorities by observing proper discretion at times while driving over stretches of road just beginning to deteriorate or which may be undergoing temporary repairs.

By endeavoring through careful driving and an intelligent observation of road conditions, the motorists of the country may become a very valuable and active adjunct in the good roads movement, a movement in which motorists and automobile organizations are vitally interested, but in which the individual motorist often forgets his own responsibility.

The Touring Club of America, through its various New England branches, has made a special effort this year to impress upon tourists, the great majority of whom use the splendid highways of Connecticut and Massachusetts without paying additional fees, the importance of reasonable driving wherever conditions show that a little care will help immediately in benefiting the roads.

Commissioner William D. Sohier of the Massachusetts highway commission, in a recent statement on road conditions in his state and the increasing amount of work done every year to properly maintain them, shows very clearly how motorists may render very practical aid to the commission in its efforts toward road perfection.

"All drivers of automobiles," he says, "must have noticed the ruts that have formed not only in gravel roads, but also in the oiled roads. If the owners and operators of cars would only drive out of that rut or wheel mark, and spread the travel over a width of 10 or 12 feet on the roadway, many miles of road, which are now rapidly deteriorating, would be injured but little."



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HENRY B. VARNER, President, Lexington, N. C.
DR. JOSEPH HYDE PRATT, Secretary, Chapel Hill, N. C.

Official Organ Southern Appalachian Good Roads Association
DR. JOSEPH HYDE PRATT, President, Chapel Hill, N. C.
HENRY B. VARNER, Secretary, Lexington, N. C.

Official Organ of the South Carolina Good Roads Association
F. H. HYATT, President, Columbia, S. C.
FINGAL C. BLACK, Secretary, Columbia, S. C.

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NOVEMBER, 1911.

No. 5

THE RICHMOND CONVENTION.

The first annual meeting of the American Association for Highway Improvement at Richmond, Va., this month will be the greatest good roads meeting ever held on this continent. It will be attended by the chief executive of the greatest nation on earth and by the leading citizens, in all lines of work, in the United States. Bankers, industrial leaders, railway magnates and men of great wealth and high standing will gather in the capital of the Old Dominion to devise ways and means of securing the greatest of blessings for all classes of our people—good roads. That the meeting will be productive of great good is an absolute certainty.

On behalf of a vast army of readers, embracing within its ranks the best citizenship of the south, Southern Good Roads extends to the delegates, the officers of the association and the visitors, a hearty welcome. The south is aroused and active, ready for the good seed that will be sown at Richmond. During the past decade she has made astounding progress. What the next decade will bring forth cannot be even guessed at.

We are confident that the great meeting in Richmond will prove the most helpful gathering that the good roads movement has yet known and that from it will radiate influences that will revolutionize conditions in Virginia and in every southern state.

SECRETARY WILSON'S ATTITUDE.

We confess to no little surprise at the attitude of Hon. James Wilson, secretary of agricultnre, in regard to federal aid for road-bnilding. The aged secretary has weathered many storms, some of them of very recent oocurrence, but we believe that he has waded into one now that will spell real trouble to him before it has ended.

In a letter to Highway Commissioner Sidney Suggs, of Oklahoma, "Uncle Jim" states positively, according to dispatches from Oklahoma City, that he is opposed to federal aid in any shape or form in the good roads movement.

He gives as his reasons for this attitude that if he urges any such plan it would "seriously interfere with his standing among congressmen," allnding to previous experiences of a similar nature, and that in his opinion the good roads movement is not instigated and promoted by the people, but in reality the automobile manufacturers are behind it.

As to the first reason stated, Secretary Wilson may have cause to want to dodge. Not all congressmen are progressive and he might make enemies by coming out boldly for a meaure that would insure to the farmers of the United States an undreamed-of era of prosperity, but he wanders far afield in the second reason named. In declarling that the good roads movement is not backed by the people but is fostered by the automobile manufacturers of the country, he puts himself in line with an element of our citizenship that is retarding progress in every county in the south. Secretary Wilson is not the first man to declare that fine roads benefit mainly the automobile, but he is the first man in high position to do so. Heretofore, this argument against progress has come from short-sighted men, men lacking in public spirit and possessed of a narrow vision.

Very few of the good roads enthusiasts of the nation are automobile manufacturers and not a great number of them are automobile owners. These progressive spirits are laboring and have labored for years for improved highways because in improved highways they see the solution of many vexing problems. In improved highways they see the way to improve rural schools and keep bright boys and girls on the farm during the formative periods of their lives. In improved highways they see increased wealth, the lowering of the cost of the necessities of life to the toilers in factory and shop, and thonsands of other good things. Seccretary Wilson's statement that the good roads movement, which has been fostered and developed by the sacrifices of these heroic souls, is designed and intended to benefit a few manufacturers, is an insult to every good roads enthusiast in the country.

* * *

There is not the slightest possibility of our reaching our ideals in public education until all of our rural schools can be reached by good roads.

Good Roads are inseparably connected with good schools.

* * *

The Texas Commercial Secretaries' Association declares that bad roads constitute a moral issue. A man of good morals, says the association, will vote for good roads, but men of good morals can very easily contract bad morals from bad roads.

* * *

No one will deny that the building of public roads is a public function. Why, therefore, should the building of public roads be put upon a different footing from that of other public benefits? Road-building is one of the public burdens that should be borne by every citizen in accordance with his means. The necessary revenues should be secured by the levying of taxes.

* * *

It has been the experience of the American people in their 134 years of freedom, that the farm has been the nursery from which has come the new blood, the strong, virile men and women to fill the gaps in the cities and keep going the industry and commerce of urban life. It therefore behooves the American people to maintain the nursery in order that the body politic be directed toward this end. The greatest factor in the healthy growth and development of rural life is the improved country road.

* * *

We have donated nearly 200,000,000 acres of public lands to assist in building railroads, against whose excessive rate charges we now require an Interstate Commerce Commission. We have spent nearly \$600,000,000 in river and harbor improvements and light houses to safeguard commerce. It is coming to be understood that drainage of large tracts should be done by the federal government and not by states. The logical solution of national good roads is likewise under government supervision and with aid.

* * *

Good roads made Rome the market place of the world, likewise, the educational centre of the world. This high position could not have been attained without the magnificent roads of the Caesars, and it has been the experience of every other municipality since that time, that good streets and good roads are essential to commercial and educational pre-eminence. The town, large or small, that feels a "hankering for" increased trade facilities and the prosperity that comes from an influx of farm products, may spare itself the expense of erecting costly market houses and making other provisions to take care of the trade until it builds good roads.

* * *

In nine tenths of the counties of southern states there is room for 100 persons where there is but one today. Vast areas of land are lying waste, adding nothing to the sum total of southern wealth and prosperity. Land that would produce a bale of cotton to the acre and seventy-five bushels of corn, after a few

years' care and attention, is given over to the growing of noxious weeds and can be purchased today at from \$7.50 to \$12.50 per acre. It ought to sell for \$25 to \$30 per acre, and even more, but it is inaccessible, far from the markets, cut off from good schools and therefore unfit for human occupation. Good roads would do away with all of these disadvantages and double, even treble, the wealth of the south in the next decade.

* * *

A man who has become accustomed to the conveniences and improvements which make for his well being, will not thereafter be content to live without them. The man who has lived in the town possessing good streets, a system of sewerage and drainage and a healthful and abundant supply of water, cannot be induced to live in another town lacking in these facilities; and likewise a farmer who has lived in a rural community possessing good roads, telephone facilities, good, public schools and intelligent neighbors cannot be induced to move to another rural community which does not enjoy these advantages. Will the people of the south ever awake to the fact that the south can never realize the full measure of its possibilities without spending money to make life attractive to would-be settlers?

* * *

The average farmer kicks strenuously every time such a thing as a special tax is mentioned. No matter what the special tax is for, he kicks. In some counties this is not true, but in the great majority of southern counties the rule holds. He kicks with exceptional spirit and vigor when special taxes for good roads are mentioned. He forgets that every mud hole, or bad place in the road is a "special tax" on his income, and one that he pays not once a year, but every time he travels the road. He takes no account of the large part of his time that he spends in mending harness and repairing vehicles. He takes no account of the many pleasant hours of rainy and disagreeable days that could be spent in happy companionship with wife and children were it not for the fact that he has to spend that time "in the shed," or "at the barn," mending equipment broken by bad roads.

* * *

Good Roads Increase Income of Farm.

At Marion, S. C., a few months ago, a stranger remarked upon the exceptional number of teams bringing in cotton Monday. He was informed that this was due to the fact that cotton on that particular day was \$1.25 per bale higher than usual. It seems that the roads to the west of Marion are good, while those to the east are bad. The stranger encountered two teams, one coming from the east, and one from the west, bringing in loads of cotton. The team from the good roads section brought in seven bales, netting the owner a premium of \$8.75, while the team from the bad roads section brought in two bales, netting the owner a premium of \$2.50. This is an eloquent commentary from the standpoint of the pocketbook.

Tarrant county, Texas, will vote November 25th, on a million-dollar bond issue for road construction.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

At a meeting of the Alabama state highway commission at Birmingham Oct. 9, it was decided to issue a call for an All Alabama Good Roads conference to be held at Montgomery next January.

Invitations will be issued to the probate judges, the boards of revenues, the county commissioners, the county road engineers, the county road supervisors and the road foremen of the state to attend this conference. A number of good roads experts will address the meeting on the subject of road and bridge building and a movement will be started to bring about a more uniform system of road building and an intelligent expenditure of the money on the road improvements.

The Alabama Good Roads Engineers' Association that was formally organized at the annual convention of the Alabama Good Roads Association held at Selma the latter part of October will attend the state good roads conference.

The commission will compile between now and the next quarterly meeting statistics showing the number of counties that are preparing to issue good roads bonds or that have recently authorized the issuance of good roads bonds.

Arkansas.

The business men of Eureka Springs have endorsed the "White Way," a proposed model road twelve miles long, to be built between Eureka Springs and Berryville. The estimated cost of the road is \$12,000 of which amount the citizens of Eureka Springs have pledged themselves to raise one-third, the citizens of Berryville one-third and the planters along the proposed route the rest.

Florida.

The Pensacola Journal regrets very much that the legislature of its state turned down the proposition of submitting to the voters of that state the question of issuing \$5,000,000 bonds for road improvement. Remarking on the fact that \$140,000,000 will be spent on road improvements by state and county authorities in the United States, and naming over some of the largest investors in good highways, it says: "If Florida's all-wise legislature had been willing for the voters to have decided whether they wanted to spend five million dollars for road improvements as well as putting the convicts to work upon the roads, this state would be receiving some good advertisement throughout the country. The property owners of Florida will not be satisfied until there is a network of good roads not only to the larger cities in the state, but to the smallest villages. The sand-clay roads are easily made in all sections of the state and the farmers insist upon having good roads leading to their places of residence."

Says the Miami Herald: Miami is one city in the country where it has never been necessary to preach good roads. No propaganda was ever necessary here to convince the people that good roads are a good thing. Every citizen, as soon as he becomes a citizen, is an immediate convert to the economic doc-

trine that good roads are cheaper than bad ones. Every man who owns an automobile, and there are hundreds of them; every owner of a bicycle, and there are thousands of them, every vehicle owner and every pedestrian is an enthusiastic good roads advocate, not only for this section, but he is a missionary to other and less enlightened communities.

* * *

Georgia.

The official route for the 1911 Good Roads Tour Around Georgia has at last been definitely fixed.

Delay has been due to the necessity of investigating a number of routes across the southern section of the state, where little clay has been mixed with the sand, in order to find a route that is both short and good.

After careful consideration, the route through Clinch county, between Valdosta and Baxley, has finally been determined upon, assurances being given by the county authorities that the roads upon this route will be put in good shape for the tour.

The selection of this route will save approximately 25 miles on the third day's run, when the saving of distance is important. This run from Valdosta to Baxley will now be about 112 miles, instead of 135, the distance around by Nashville and Willacoochee.

* * *

Kentucky.

Stark Bros., of Louisiana, Mo., the largest nurserymen in the world, have made an offer to the promoters of the Jefferson Davis Way to supply shade trees to plant along the road. They suggest Catalpas as being the best suited to the purpose, but wish to mix in a few Bignellii and other rare ornamental shade trees. The people who are behind it claim that they are going to make the Jefferson Davis Way the most beautiful highway in America.

* * *

Louisiana.

Under the new good roads law, the state of Louisiana will pay half the cost of construction of improved highways in Louisiana after January 1st. Mr. George M. Cooley, government representative in charge of good roads construction in that state, says that the Highway Department has already on file more applications from parishes for the construction of roads under this law than the state will have funds to meet. "Interest in good road work is constantly growing," said Mr. Cooley, "as the value of roads is being demonstrated by the construction of model highways in certain sections."

The parish of St. John the Baptist won the trophy offered by the New Orleans Picayune to the parish having the best roads in the state of Louisiana; the trophy was presented to the sheriff of the parish by Hon. J. Y. Sanders, Governor of Louisiana. The trophy is a massive sterling silver cup, with the following inscription on its side: Picayune's New Orleans-to-Memphis Good Roads Trophy. Awarded to the Parish in Louisiana Having the Best Road on Route of Tour, Aug. 12, 1911. Won by St. John the Baptist Parish.

Michigan.

The last meeting of the legislature of Michigan passed a law that is an excellent one and one that should be copied in many other states. Michigan is notorious for its poor roads, and the legislature passed a law by which the state pays \$500 for each mile of public road built under the state's supervision. It has been demonstrated that roads there can be built at an average cost of about \$2,200 per mile, and the new law has had the effect of launching a good road campaign that is sweeping the state. Thousands of miles of public roads have been built there this year or are in process of construction.

* * *

Mississippi.

The feature of the second day of the Mississippi state fair, and one of the most interesting features of the entire week, was the statewide Good Roads Congress, which met in the county courthouse at Jackson the 25th of last month. Mississippi is afire with the good roads fever; the movement is backed by earnest, aggressive and patriotic Mississippians who are determined that their state shall have a system of highways that will compare favorably with that of any commonwealth in the union.

The chief purpose of the meeting was to form a state organization that will push the good roads movement with aggressive energy, and adopt all practical means of carrying the campaign into every county in the state. During the early forenoon many of the delegates visited the State Fair, and their interest chiefly centered in the splendid exhibit of road-working machinery sent from all parts of the country.

Conspicuous among the delegates were members of boards of supervisors of the seventy-eight counties. Some of these boards attended in a body, accompanied by engineers and contractors in charge of their road improvement projects.

The New Orleans Picayune some time ago offered two handsome silver loving cups to the parish in Louisiana and the county in Mississippi having the best highways in their respective states. The Mississippi cup was won by Coahoma county; it was presented by Captain Ike Remnyson, who refereed the tour that decided the contest. The Picayune asks and desires nothing but that these two counties shall maintain their positions at the head of the good roads movement in their states.

More than twenty counties in Mississippi have issued bonds for the purpose of building good roads, the list as reported being as follows: Alcorn, \$55,000; Clay, \$60,000; Coahoma, \$175,000; Copiah, \$75,000; DeSoto, \$25,000; Hancock, \$25,000; Hinds, \$200,000; Issaquena, \$25,000; Lamar, \$15,000; Monroe, \$100,000; Pontotoc, \$20,000; Rankin, \$30,000; Sharkey, \$50,000; Simpson, \$40,000; Tishomingo, \$35,000; Tunica, \$50,000; Union, \$50,000; Washington, \$100,000.

This does not comprise the entire list of bond issues for road building, but is all that have reported to the agricultural commissioner.

* * *

Missouri.

At Columbia, Mo., P. S. Quinn highway engineer of Boone county, has organized a school of which he is the teacher, and the various road supervisors of the county the pupils. They meet in the circuit court room of the county court house to discuss various problems of road building and maintenance.

Quinn believes that such a school is necessary if the

county is to have good roads; much of the time of the first session was devoted to acquainting the overseers with the provisions of the road laws. He made it plain to the men that they had the authority to keep the roads clear, no matter what the landowners said, and he wanted them to exercise their authority.

Mr. Quinn holds to the very reasonable doctrine that no man can properly take care of a road unless he knows something about road-building himself; with this idea in view he has organized his school in order that all his supervisors may learn the rudiments of highway engineering.

* * *

New York.

The experience New York is having with its good roads campaign should teach the rest of the country the importance of not undertaking too much at once and to not go into the work without perfect organization. It takes time and much effort to carry out a state-wide good roads program. Money and good intentions are essential but they are not the only things. The people of New York voted a \$50,000,000 bond issue, the money to be used in constructing a series of roads to serve the rural districts of the state. Governor Dix, in an address at the state fair in Syracuse, said that 50 per cent of the money has been obligated and will complete only 25 per cent of the proposed mileage. Another bond issue of \$50,000,000 will be needed to carry out the original program.

This deplorable state of affairs is due entirely to the weakness of the organization first planned to handle the funds and see to the building of the roads. Now that this defect has been remedied, better results may be expected. In another part of Southern Good Roads this month is outlined the Empire State's present system of road-building, which has grown out of long and sometimes bitter experience.

* * *

North Carolina.

Iredell county is getting into the game in earnest. A camp was pitched near Mooresville about the middle of the month and a force of road-builders sent out to stay on the job all the time. Fourteen of the county's big mules were taken out and others have been hired from near-by farmers. The whole crew is in charge of an experienced road engineer, and they are making the dirt fly.

* * *

Oklahoma.

Dill township, aided by the town of Lugert through public donations has just completed quite an engineering feat, that promises to make Lugert the principal trading point in the south west part of Washita county, drawing trade even from portions of Greer county.

Lugert is located at the foot of the Wichita mountains, and the only available pass through the foot hills to the south was utilized by the Orient railway in building their roadbed to the south. One other rocky pass, however, was available by building a concrete highway for a length of 510 feet through a deep canon, barely passable for a horse. Plans were formed, but owing to the heavy expense it was necessary to secure aid for the township. Following a meeting of the interested parties, \$225 in cash was subscribed in addition to 70 days work by farmers and others interested in the village of Lugert. It was first necessary to take sledges and hew a path the desired width for a vehicle, after which this was over laid with a

smooth surface of solid concrete. In the center of the work the path is double width permitting two or more vehicles to pass each other, should they be so caught.

By making this pass accessible, it saves many a mile of hard hauling through the Red river bottom, and places several hundred thousand acres of valuable farming land right at the door of this progressive village.

* * *

South Carolina.

The Columbia State has adopted the policy of publishing once a month a page of good roads news from South Carolina. In its issue of Oct. 23rd it described the progress in road-building in Marion county.

In the last six months this county has perfected an excellent road force and equipment and the work is being done according to the most approved methods of construction. All bridges and culverts are being replaced by structures of an absolutely permanent character. In general all streams requiring a span of more than two feet are being crossed by reinforced concrete culverts, and when the span is less than two feet the best grade of terra-cotta pipe is being used, provided it can be bedded so that the top of the pipe is at least 18 inches below the surface of the road. In cases where this condition does not exist reinforced concrete will be used for these small culverts.

The annual meeting of the Good Roads Association of South Carolina will be held in Columbia during the week of January 17, the week after the convening of the general assembly. The membership of the association has been greatly increased during the year, and a most successful meeting is expected.

* * *

Texas.

At the request of county judge O. C. Funderburk, R. E. Tomis, the federal government good roads expert last month visited Anderson county and made an extensive investigation into road conditions and possibilities, the result of which he communicated to Judge Funderburk and his court in an exhaustive report on the subject. His most earnest recommendation is for the systematizing of the work of highway improvement. He would have all the roads of the county mapped out and graded according to their importance, as first, second and third class roads, to be improved in that order. He recommends the establishment of a standard width for each class of road, and above all, he urges that provision be made for the maintenance of a road as soon as it is completed. Sand-clay is the road-building material he recommends for that particular section, and the split-log drag is his ideal of the machine to keep it up.

* * *

Tennessee.

Prior to the issuance of \$200,000.00 in bonds for improving the roads of Sullivan county, Tenn., its roads were almost impassable. The condition of these roads is illustrated by the difficulties a farmer experienced in hauling barbed wire from Bristol to Kingsport, a distance of 23 miles. The load for a 2-horse team consisted of 500 pounds, and the farmer stated that three days were required to make the trip. Twelve days were consumed, therefore, in hauling 2,000 pounds of barbed wire from Bristol to Kingsport. Estimating the cost of man and team at \$3.00 per day, the total estimated cost of delivering the barbed wire was \$36. On the new road from Bristol to Kingsport, 2,000 pounds can easily be hauled in one day with the same

team at an estimated cost of \$3.00. While this may be an exceptional case, it clearly shows that time as well as quantity should be taken into account as an important factor in figuring the cost of hauling.

In the county above referred to, another farmer who lived only a few miles from Bristol, stated that the road was so bad the winter before that he was compelled to let 100 bushels of Irish potatoes rot in his cellar, in spite of the fact that potatoes were selling then on the Bristol market for \$1.40 per bushel. It was afterwards learned that the Bristol commission men had been shipping potatoes all the way from the state of Michigan. A Bristol merchant is authority for the statement that about 10 carloads of northern and western corn, wheat, oats, hay, potatoes, etc., were shipped into Bristol and adjacent territory.

* * *

Virginia.

The Old Dominion has suffered some very bad advertising lately by reason of the wretched condition of her roads when the Glidden tourists reached them. Just four minutes out of Roanoke there is a little creek that the rains had converted into a roaring torrent, and teams of mules had to be collected to haul the machines through. "The best advice to automobilists going south," ran a telegram sent back from Winston-Salem, "is to get an aeroplane at Natural Bridge and remain in the air until the North Carolina line is passed." The advocates of good roads in Virginia are hoping however, that this very criticism, together with the enthusiasm which will be aroused at the National Congress to be held at Richmond November 20-23 will spur that state into activity, and that a revolution in highway improvement may be accomplished within the next twelve months.

* * *

West Virginia.

The week beginning November 13th will be designated as "Good Roads Week" in West Virginia. The state Board of Trade has asked all civic organizations to devote themselves to the task of seeing that the time is properly used to crystallize sentiment in favor of the good roads movement in order to bring about better conditions in their jurisdictions. A proclamation setting forth the week for such purposes as indicated has been formulated by Governor Glasscock and will be given due publication, soon as it is corrected and made ready for the printer.

Good Roads and School Attendance.

Mr. C. M. Massey, County Superintendent of Schools, Durham county, N. C., reports that attendance in schools on good roads is about 70 per cent, and on bad roads about 50 per cent. He states that lands along the roads leading out from Durham sold for \$10.00 to \$25.00 per acre, and that since the roads have been improved they bring from \$50.00 to \$100.00 per acre. He states that farm lands along improved roads are worth three times as much as those on bad roads and that the people have moved off of the bad roads and on to the good roads.

In Bradley county, Tenn., population of 16,000 in 1900 issued \$90,000.00 in bonds. There was bitter opposition, but before money was half spent, the amount was increased to \$116,000.00, selling for \$120,000.00. Before roads were built, land went begging at from \$8.00 to \$10.00 per acre, and now sells easily for from \$15.00 to \$30.00 per acre.

GOOD ROADS NOTES IN BRIEF

Mecklenburg county, N. C., built 150 miles of macadam by convict labor; cost about \$3,500.00 per mile. Land 8 miles from Charlotte \$10.00 to \$25.00 per acre then, but now from \$50.00 to \$100.00 per acre.

Jackson county, Ala., \$250,000.00 bonds, built 125 miles of good roads in 2 years. Census value of land in 1890 averaged \$4.80 per acre. Ready purchasers now at \$15.00 to \$25.00 per acre.

In Hall county, Ga. (Gainesville), 65-acre farm was bought for \$1,800.00. A macadam road was built through farm and owner was offered \$4,500.00 for same.

In Hamblin county, Tenn., (Morristown), a farm sold for \$6,000.00 before roads were built; and afterwards sold to Mr. Campbell, of Hancock county, for \$15,000.00.

An Apex, N. C., farm before gravel road was built, sold for \$700.00. After road was built, it sold for \$4,500.00.

Montgomery county, Indiana, has improved 134 miles of her highways since 1905.

The state of Illinois spends five and a quarter millions of dollars annually on her highways.

Robertson county, Texas, is soon to vote on the question of voting \$150,000 bonds for good roads.

The Atlantic Coast Line will start a good roads train over its system from Richmond, Va., November 23rd. The train will travel through Virginia, North and South Carolina, Georgia, Florida and Alabama.

Bigheart township, Osage county, Oklahoma, has voted \$50,000 good roads bonds.

Says the Atlanta Constitution, "Good roads are the insurance premium that counties ought to be glad to pay on policies of prosperity."

Wisconsin will spend \$1,200,000 improving her highways within the next twelve months. Out of 71 counties only 6 failed to make an appropriation for good roads.

The York County Good Roads Association was formed at Yorkville, S. C., as a direct result of the visit of the Southern's good roads train to that town.

\$400,000 of California's \$18,000,000 of good roads bonds have been issued.

45 counties in Texas have 646 split-log drags in use on their roads.

Walker county, Texas, has an engineer at work surveying and platting seventy-five miles of good roads which the county will build at once.

Glenn county, Cal., has issued \$450,000 good roads bonds, and Fresno county is talking of issuing \$3,000,000. California is getting ready for the Panama-Pacific exposition.

Coffee county, Ala., has issued \$100,000 good roads bonds.

Webb county, Texas, is raising \$3,000 by private subscription to improve her highways.

At Parkersburg, W. Va., they serve chicken suppers to increase the amount in the treasury of the good roads association.

Elm Springs, Ark., is preparing to build seven miles of good road at a cost of \$1,500, which has been raised by private subscription.

Fort Worth, Texas, is paving two streets with bitulithic.

Tulsa county, Okla., has bonded herself for the improvement of her highways to the amount of \$500,000.

The bonds were sold in less than a week after the election, and a good deal of work will be done on the roads before cold weather.

A good roads enthusiast in Pennsylvania bought 1,000 inches of advertising in a local paper to tell his neighbors why they should have good roads. As a result the township has become one of the most notable in the state in the matter of road improvement.

A syndicate in Mattoon, Ill., is preparing to build a concrete automobile track from Mattoon to Arcola. They claim that in this way interurban service is secured at a lower rate and with fewer dangers than the trolley.

The Board of Trade of Jacksonville, Fla., holds a good roads meeting in some village near the city every Saturday.

Jackson county, Oregon, with a population of 25,756 has voted by a majority of 1,650 for a good roads bond issue of \$1,500,000.

E. T. Brown, of Coalgate, formerly county surveyor, has been appointed highway engineer of Coal county, Oklahoma.

Fort Mill, S. C., has voted \$4,000 bonds for macadamizing and asphalting Main street.

West Palm Beach, Fla., has voted \$10,000 for street improvement.

Sumner county, Tennessee, will vote December 23 on the question of issuing bonds for road construction to the amount of \$200,000.

The city of Columbia, S. C., has awarded a contract for paving Hampton street.

The city of Hendersonville, North Carolina, and the Hendersonville Traction Co., together have awarded contracts for road improvement at about \$20,000. The city has also awarded a contract for resurfacing a macadam road at \$20,000.

Fayette county, Ky., has awarded contracts for macadamizing a highway from Harrodsburg pike to Picadone School.

Louisville, Ky., is spending \$15,000 in paving.

Etowah county, Alabama, is preparing to construct a model road.

Kissimee, Fla., will pave her streets with vitrified brick.

Wilson, North Carolina, will resurface about 20,000 square yards of street with asphalt.

The city of Harlingen, Texas, has voted \$32,000 for street improvement.

Houston Heights, Texas, is putting \$180,000 in street improvements.

The city of New Iberia, La., has voted \$35,000 to build a road 12 miles to Jeanerette.

Big Heart township of Osage county, Oklahoma, has voted a \$50,000 bond issue for road improvement.

Uniontown, Alabama, has decided to issue \$10,000 worth of bonds for cement sidewalks.

Precinct No. 1 of Wichita Falls, Texas, has issued \$150,000 bonds for road improvement.

Jackson county, Tenn., will vote Dec. 9th, on a proposed good roads bond issue of \$150,000.

Harnett county, North Carolina, will decide December 12th, whether to issue \$100,000 worth of bonds for road improvement.

Knoxville, Tenn., has awarded paving contracts to the amount of about \$25,000.

Portsmouth, Virginia, has awarded contracts at \$9,174 to grade 10 streets, and at \$30,116 for concrete curb and gutters and concrete walks.

Dallas county, Alabama, has awarded contracts to construct 18 miles of road at a cost of \$30,000.

Broad street, in Augusta, Ga., is being paved with brick.

Palatka, Fla., has awarded contracts for 15,000 square yards of brick paving with concrete curb.

Salem, North Carolina, will vote December 26th, on a bond issue of \$15,000 for street improvements.

San Antonio, Texas has appropriated \$43,424.30 for paving streets.

Waycross, Ga., will construct 35 miles of sidewalks.

Gov. John A. Dix has issued invitations to the chief executives of all the states of the United States and Canada to be present at the eighth annual convention of the American Road-Builders' Association, to be held at Rochester November 14, 15, 16 and 17.

The Ohio Good Roads Federation will endeavor, at the coming Constitutional Convention, to have an amendment made to the constitution of that state providing for the issuing of \$50,000,000 bonds for a state system of good roads.

Good Roads tours to the American Road Congress held in Richmond November 20 to 24, were organized in all parts of the country, some coming from as far away as Minnesota.

The University of Georgia has elected Mr. John C. Keech Professor of Good Roads. Prof. Keech's services will be at the demand of counties desiring help in good roads campaigns.

Washington county, Tenn., has voted to issue \$60,000 bonds to construct the Washington county link of the state highway.

Loudon county, Tenn., has voted \$25,000 bonds for road improvements.

Perry county, Ala., has issued bonds to the amount of \$110,000 for road construction.

The city of Aiken, S. C., has awarded a \$13,500 contract to pave Main street.

Chester county, S. C., has awarded contracts for the construction of sand, clay and gravel roads to cost \$5,000.

The city of Florence, S. C., is spending about \$50,000 in paving.

Galveston county, Texas, has awarded contracts for about 4900 yards of vitrified brick paving and for surfacing roadways with mud shell.

The city of Greenville, S. C., is paving Augusta avenue with asphalt.

Louisville, Ky., has awarded contracts at \$23,200 to pave a portion of Broadway with asphalt.

The Southern Railway is having 17th street, Lynchburg, Va., macadamized.

Lawrence county, Mississippi, has awarded contracts for road construction in Beats 1 to 5 inclusive.

Norfolk county, Virginia, has awarded contracts for the construction of a sand-clay automobile road.

Wharton, Texas, is constructing \$4,000 worth of additional sidewalks.

Ohio county, W. Va., has awarded a contract at \$11,787 to pave Glendale road.

The city of Baltimore, Md., will have about \$1,000,000 available for constructing about 20 miles of paving in 1912, to include Belgian block, vitrified brick, etc.

Hamilton county, Tennessee, has appropriated \$20,600 for construction and repair of roads on Lookout Mountain.

Galveston, Chambers and Jefferson counties, Texas, will jointly construct a road to connect the three.

The city of Pensacola, Fla., is preparing to lay about 180,000 square yards of paving, and about 116,000 linear feet of concrete curb.

Henry county Tennessee, has appropriated \$10,000 for road improvements.

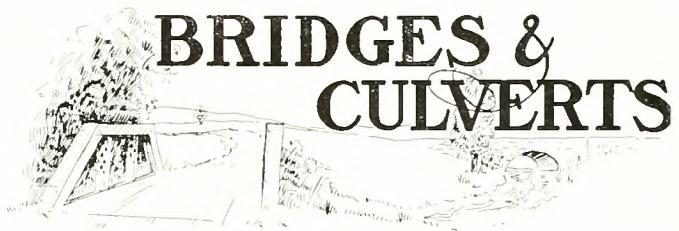
Pine Bluff, Ark., will construct about 20,000 square yards of wood-block paving.

The city of Richmond, Va., has appropriated \$5,000 toward the construction of the Gordonsville-Richmond-Williamsburg highway.

Macon county, Ala., is preparing to build ten miles of good roads.

Wallace township, Duplin county, N. C., has joined the good roads procession. The good roads election held there last month was carried by a vote of 203 to 40. With the money voted a fine system of sand-clay roads will be built.

Upshur county, Tex., has commenced spending \$20,000 on its county roads. It is their plan and purpose to run four main roads north, east, south and west to the county line, then build intermediate roads running into these.



Jefferson county, Alabama, will build a bridge over the Warrior river. It will be of steel, 400 feet long and will cost about \$25,000.

Nassau and Duval counties Fla., will build a 550 foot bridge across the Nassau river at a cost of \$6,000.

Colquitt county, Georgia, will vote November 27, on a bond issue of \$85,000 to construct steel and concrete bridges.

New Orleans, La., will build bridges over the People's Canal at Gentilly Road, and over the Old Basin Canal at Hagan Avenue.

Houston, Texas, will spend \$4,000 to \$5,000 building a culvert to protect from floods the territory in the vicinity of Washington Avenue and Sawyer street.

Holmes county, Mississippi, is constructing a steel bridge over Bophumpa creek on Lexington and Acona road.

Mecklenburg county North Carolina, will build a bridge over Long creek on Rozzell's Ferry road.

Lexington county, South Carolina, will build a bridge over the Saluda river at Stillwater.

Morristown, Tenn., will build a bridge on Main street across Turkey creek.

McNairy county, Tenn., will construct two steel bridges, one over Cypress creek at Selmer, and the other over Big Shale creek about 12 miles east of Selmer.

Surry county, Virginia, will construct a 45-foot steel truss over the Blackwater river, 3½ miles from Waycross, Va.

Natchitoches county, La., has awarded a contract at \$8,600 to build a bridge across Cane river.

The Winn Parish, La., Police Jury has awarded a contract at \$2,500 for construction of a bridge across bayou Dugdemonia.

Stokes county, N. C., has awarded a contract at \$1470 to erect steel trestles and repair a bridge across Little Yadkin river.

Rowan and Davie counties, N. C., will build a bridge to cost \$6,000 across the Yadkin at South River.

With Southern Good Roads' Advertisers

The advertisement of Tarvia in this issue is a very convincing one. The accompanying cut shows a tarvated street, in Danbury, Conn., and underneath it appears a very high tribute to Tarvia from Mr. William T. Woodin, superintendent of public works of Danbury. The Barrett Manufacturing Company, New York, Philadelphia and other cities, will furnish full information on request.

* * *

In the advertisement of the Indian Refining Company this month appears a striking letter from Mr. David Bruce Brown, of New York City, who declares that the company's asphalt oil is the finest road preservative made. For this opinion he cites the good results obtained on an automobile race-track, where big cars made an average speed of more than 70 miles per hour, without any apparent damage to the race course. Indian products "blazed the trail" and today stand high with road-builders as preservatives. The company has offices in New York, Atlanta, Chicago and other cities.

* * *

The Standard Oil Company's road preservatives wear well. Road-builders should note the very convincing photographic proof of lasting qualities in the Standard Oil Company's advertisement in this issue. This shows a road near South Sudbury, Mass., after more than a year of heavy traffic, in just as fine shape as it was the day the Standard Macadam Asphalt Binder "A" was laid. The Standard Oil Company offers a variety of products for maintaining different kinds of roads.

* * *

A new advertisement in this issue is that of the Concrete Form and Engine Company, of Detroit, Mich. This company has something new in the way of collapsible steel forms for the building of concrete culverts and for other concrete work. Their forms are marked by strength, durability and simplicity and are very easy to operate. They will last a life time. The company claims that the use of their forms cut the cost of culvert building in half.

* * *

The Southern Railway, one of the leading forces in every movement for the upbuilding of the south, advertises in this issue of Southern Good Roads a few of the advantages offered by the Southeastern section of the United States. This section of the south offers wonderful advantages to the farmer in soil, climate and crops. The land is cheap. It also offers equally fine advantages to the manufacturer, the man out of a job and the man seeking a healthful, delightful place to live in. Col. M. V. Richards, land and industrial agent of the Southern, Washington, D. C., stands ready at all times to help all seekers after information to find just what they are looking for.

* * *

The Glide Grader, manufactured by the Glide Road Machine Company, Minneapolis, Minn., is one of the finest machines of its kind on earth. It weighs 650 pounds and can be operated by one man and two horses. The machine is described in an advertisement in this issue.

* * *

The Jefferson Powder Company, of Birmingham, Ala., advertises its very satisfactory line of explosives

in this issue. This southern company is turning out a fine line of goods and is building up a big business.

* * *

The Huber Manufacturing Company advertises its contractor engine in this number of Southern Good Roads. This engine can do anything from running a cement mixer to rooting up the hardest street in the country.

* * *

In the use of explosives the main problem is to make them produce the maximum results. The E. I. DuPont Powder Company, which has a half page ad in this issue, says that the way to do this is to use the right explosive in the right place. The first DuPont mill was built in 1802 and the company has been growing wiser ever since. Their experts are the best in the world and their services are at the instant disposal of users of explosives everywhere.

* * *

Strength and Durability mark "Harry's" corrugated metal culverts. In this issue of Southern Good Roads appears the advertisement of Harry Brothers Company, manufacturers, with a large cut of one of their famous culverts in use. The company has offices in New Orleans, Dallas, and Newport, Ky.

* * *

The Improved Simplex Russel Reversible Road Machine, made by the Russel Grader Company, of Minneapolis, Minn., is small, easily handled and effective. The company sells it on free trial basis if desired. Their ad appears in this issue.

* * *

No railroad, north or south, offers better service than the Norfolk & Western, whose advertisement appears in this issue. If you are going north, northeast, southwest, or to any section touched by the N. & W., or associated lines, the wisest thing to do is to invest in a postal card and ask for full information. Full information may be had by addressing any one of the three officers named in the advertisement at the head offices, Roanoke, Va.

* * *

The Ohio Road Machinery Co., of Oberlin, O., advertises two of its machines in this issue. This line of machinery has many special features that should prove attractive to contractors and road officials.

* * *

The use of convicts on the public roads is growing all over the south. In this issue M. D. & H. L. Smith Co., of Dalton, Ga., advertised their line of convict clothing, tents and supplies.

* * *

The Baker Manufacturing Company, of Chicago, Ill., advertises this month its 20th Century Grader, a road machine of many good features. It weighs only 600 pounds.

* * *

The Pomona Terra Cotta Company, of Pomona, N. C., manufactures a line of vitrified terra cotta pipe that has few equals. The company has an advertisement in this issue.

* * *

The Robeson Process Company, of Washington, Philadelphia and New York, asserts in this issue of Southern Good Roads that when you build roads as you run

your own business, you will use glutrin—"the best road binder made." This material is worth investigating and road-builders and road officials should look into the matter.

* * *

Jim Fellowes' line of talk this month is "fair enough." He invites an honest comparison with other wagons on the market, seemingly confident that the great Watson is the best dump wagon on earth. It is manufactured by the Watson Wagon Company, of Canastota, N. Y., and the company has branch offices in New York, Philadelphia, Pittsburg and Chicago. Mr. M. F. Poyntz, of Roanoke, Va., is Virginia sales agent.

* * *

The Barber Asphalt Paving Company, of Philadelphia, in their advertisement this month, call attention to the merits of Trinidad Liquid Asphalt, a product which has all of the stability of Trinidad Lake asphalt. The company claim that their product is a permanent constructive agent and not a mere temporary dustlayer. It stays in the road and does not "bleed." They make it in two grades, one for use cold and the other for use hot. Offices in all of the principal cities.

* * *

The North Carolina Metal Culvert Company, of Greensboro, N. C., is making a distinct hit with its American Ingot Iron Culverts. Thousands of them are in place all over North Carolina and are giving entire satisfaction. Their ad appears in this issue.

* * *

The Consolidated Expanded Metal Companies, of Pittsburg and New York, advertise this month their famous "Steelerete" expanded metal. They claim that concrete, reinforced by "Steelerete," makes an absolutely permanent enlivert. That it has high merit is shown by the fact that it has been approved by the New York State Highway Commission.

* * *

The Galion Iron Works Company, of Galion, O., have received a diploma from the Mississippi state fair for the best display of road machinery, etc., at the fair. Their exhibit consisted of four carloads and "it's different." Notice their ad in this issue.

* * *

American Ingot Iron will not rust and a enlivert, garage or tank built with it is practically indestrnetible. Notice the ad of the Dixie Culvert & Metal Co., Atlanta, Ga., whose products are made of this material.

* * *

The reliability of the manufacturer determines the quality of the road roller. The Case Threshing Machine Co. claim to be the largest manufacturers of road machinery in the world, and invite the public to scrutinize their claims.

* * *

One of the handsomest advertisements in this issue of Southern Good Roads is that of the Mitchell-Lewis Motor Company, of Racine, Wis. The "Mitchell Baby Six" is an admirable car and really has but few equals in its class. "Silent as the foot of time" is no unfit characterization of the Mitchell car and the man who buys a car without investigating the merits of the Mitchell, stands more than an even show of losing money.

* * *

The Improved Wood Drill, made by the Wood Drill Works, of Paterson, N. J., is the only drill on the mar-

ket with chest and cylinder made of vanadium tungsten iron, the longest wearing metal known.

From Canada to the Gulf.

One of the most notable highways in the United States will be the great road now being laid out from Winnipeg, Canada, to Galveston, Texas, running parallel to but a thousand miles west of the National Highway. The new road will be called the Meridian Highway; the Kansas City Journal last month published an interview with Mr. J. C. Nicholson, Secretary of the Meridian Highway Association, in which he set forth some of his plans.

"We expect to have our road open by next spring," said Mr. Nicholson. "We have it all laid out in Kansas, Oklahoma and Nebraska, and expect to have it completed in the Dakota and Texas before many weeks. Our road will come south from Winnipeg along the Red River of the North, to Fargo. From there it will go straight south to either Yankton or Sioux City. Sioux City is preferred now because the Missouri river can be crossed there on a new bridge. There is only a pontoon at Yankton. The road strikes Nebraska at Norfolk, and goes south striking Geneva and Hebron.

"In Kansas the road taps the richest section of the state. The first important town is Belleville, then the road passes south through Concordia, Minneapolis, Salina, McPherson, Newton, Wichita and Wellington. In Kansas many counties have made levies for the road and we have succeeded in getting two new bridges, one over the Solomon and one over the Walnut.

"Near Southern Kansas we expect to divide the road, one line going south through Hunnewell, Blackwell, and other Oklahoma towns. The other line will go south from Arkansas City, following closely the Santa Fe railway. The lines converge again at Guthrie and strike Oklahoma City. From the Texas line southward two roads again will be followed, one following the Santa Fe railway, the other the Houston & Texas Central. From Waco, on the latter line, a branch will be built to San Antonio.

"The road undoubtedly will prove popular in the summer season, as automobileists can go from Texas to Winnipeg on good roads all the way, then from Winnipeg take a boat 200 miles into the Canadian forests. It also will prove a popular highway to the Minnesota lakes and the Red river country. In the winter it will be just as popular for travel, as it will afford an opportunity for Texas tourists to enjoy an outing."

Testing Road Materials.

Committee D-4 on Standard Tests for Road Materials, working under the direction of the American Association for Testing Materials, has submitted recently a very interesting report. This committee has been working for a year, investigating existing methods of testing road materials and devising new methods for the examination of such materials. Good work has been done. Sub-committees had charge of the various branches of the work and their reports were considered by the main committee, which recommends for adoption as provisional methods the following:

(1) Proposed provisional method for the determination of soluble bitumen.

(2) Proposed provisional method for the determination of the penetration of bitumen.

(3) Proposed provisional method for the determi-

nation of the loss on heating of oil and asphaltic compounds.

(4) Proposed provisional method of sizing and separating the aggregate in asphalt paving mixture.

The report goes on to show the difficulties that confront the experimenters in their work. A number of the special committees stated in their reports to the main committee that they did not feel justified in recommending the methods which they proposed for adoption as standard, from their work of the past year. There will be more work along these lines and within another year, even greater results may be obtained.

The work of these committees and the main committee has been summed up in language that everybody can understand and embodied in a bulletin (No. 38, of the good roads series), and is ready for distribution by the U. S. Office of Public Roads, of which Mr. Logan Waller Page is director. A fortune awaits the man who discovers a road paving material that will be elastic, dustless and durable, and this little bulletin is rich in suggestions to any person interested in the subject. It is highly probable that some form of bitumen will form the basis of this hoped-for elastic and dust-proof surfacing for highways when it is finally invented or discovered and persons of an inventive turn of mind would do well to study the matter.

The necessity for standard methods of conducting such examinations of road materials has only been recently recognized, and the bulletin mentioned is published by the department in an effort to establish a standard and make it possible for highway officials, road builders and others interested to conduct examinations that are really scientific and of authoritative value without paying for expensive chemical analyses by persons who may have no knowledge of road building and whose analyses, while perhaps scientifically accurate, would not be reduced to terms that would be readily understood by the ordinary practical man.

Good Roads Increase Land Values.

The Williamsburg and Jamestown Highway, built under the direction of the United States Office of Public Roads in 1907, extends from Williamsburg to Jamestown Island, and is part macadam and part sand-clay. Since its construction a farm with a good stand of timber, offered before the road was built for \$4,500.00 without a taker, was sold soon after the road was completed for \$8,000.00. Since then the owners have been hauling 1,800 to 2,000 feet of lumber with two miles, where before it was impossible to haul more than 600 feet. Another tract of land of 205 acres, of which 100 acres were in timber, was sold before the road was built for \$4,000.00, and since the road was built the standing timber alone has sold for \$3,500.00.

Extract from address by Francis B. Greene, President, Asphalt Paving Company, March, 1897:

"Essex county, though only 12 miles square, has built more than 200 miles fine Telford and macadam roads. Union county has borrowed \$455,000.00 at 4 per cent. on 5-20 bonds, and covered the county with a complete system of Telford and macadam roads. With the interest of the bonds added to the annual tax levy, the rate of taxation is lower than before the building of the roads, and the value of property along the roads has increased 30 to 50 per cent.

"Union county, N. J., spent over \$400,000.00 on macadam roads about 1893. The opposition claimed that county would be ruined and farms be sold to pay taxes; that farmers and real estate owners would be driven into bankruptcy; that the whole project was unsound or crazy.

"On the other hand, the value of property has greatly enhanced—increased valuation being so great that the tax rate in the country districts is much less than in adjoining counties where good roads were not built. Good roads mean smaller farms, more people, and less taxes."

At the close of 1904, Arkansas had less than 1 per cent. of improved roads and the average value of farm lands was \$16.67 per acre. Indiana had nearly 35 per cent. of its roads improved and the farm land was worth an average of about \$55.00 per acre. Mississippi had less than 1/2 per cent. of its roads improved and its farm lands were worth on an average of about \$16.00 per acre. Ohio had more than 33 1-3 per cent. of its roads improved and its farm lands were worth about \$57.50 per acre.

A Lay of Ancient Rome.

'Twas far Wisconsin that produced the first minstrel of the good roads movement; he has to go back to the days of ancient Rome to get his inspiration, but he gets it all right. This Homer of the highways smites his sounding lyre and sings thusly:

"When Caesar took a westward ride and grabbed the Gauls for Rome, what was the first thing that he did to make them feel at home? Did he increase the people's loads and liberty forbid? No, he dug in and built Good Roads—that's what old Caesar did. Did Caesar put the iron heel upon the foemen's breast, or did he try to make them feel the Roman rule was best? What did he do to make them glad he'd come their midst amid? He built Good Roads in place of bad—that's what old Caesar did. He built Good Roads from hill to hill, Good Roads from vale to vale; he ran a Good Roads movement till old Rome got all the kale. He told the folks to buy at home, built roads their hills amid, until all roads led up to Rome—that's what old Caesar did. If any town would make the town the center of the map, where folks will come and settle down and live in plenty's lap, if any town its own abodes of poverty would rid, let it get out and build Good Roads—just like old Caesar did."

What Bonds Did.

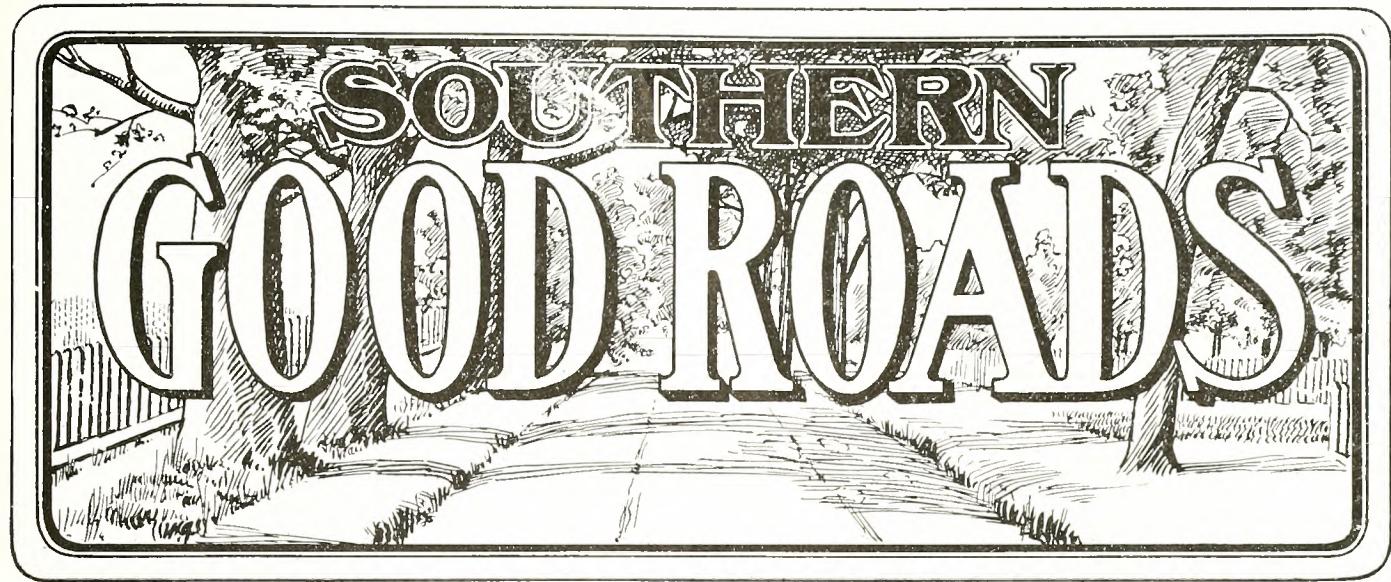
The Smith County, (Tenn.) News reminds its readers that when an effort was made to issue road bonds in Smith county it failed. The people were told that the \$100,000.00 road bonds of the neighboring county of Putnam were a burden to the people. Smith County allowed itself to be dissuaded from issuing bonds, but Putnam kept right on. The census showed a loss of 450 people in Smith county and a gain of 2,000 in Putnam.

Galveston, Chambers and Jefferson counties, Texas, will jointly construct an inter-county highway in the near future.

W. S. FALLIS, WILSON, N. C.

Civil and Highway Engineer

Highway, Bridge and Sewer Construction, Street Paving and Water Works



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second class matter

Good Roads and the Farmer

By HON. W. W. FINLEY, President Southern Railway Company, at the American Association For Highway Improvement
Richmond, Virginia, November 20, 1911

In considering the matter of highway improvement under the topic assigned to me—"Good Roads and the Farmer"—we are not taking a narrow view of the subject, for we are all directly and vitally interested in the development of agriculture in the United States.

We must rely upon the farm for by far the greater part of our food supply and for most of the materials for our clothing. We no longer have vast areas of unoccupied farm lands in the west. The constant growth of our cities and towns results in a steady increase in the demand for everything produced on the farm. This increased demand must be supplied, to a greater extent than ever before, by increasing the average production per acre and bringing under cultivation or devoting to pasture lands in our older states that are now lying idle. The problem of increasing the productiveness of our soils is being successfully solved by our progressive farmers, aided by the scientific experts of the United States Agricultural Department, the State Departments of Agriculture, and our Agricultural Colleges. There has been more real agricultural progress in the generation in which we are living than in any other period of equal duration since the dawn of history. This is to the advantage of those of us who live in cities and towns as well as of the farmers, and our self-interest impels us to support every movement tending to economy in farm operations and to larger agricultural production, for it is only by these means that the profitability of farm operations can be maintained and increased without, at the same time, unduly advancing the prices which we must pay. Not the least important of the factors tending to bring about this condition will be improved country highways. They will directly and materially reduce the cost of haulage, enable farmers to market their products more advantageously, and, by adding to the attractiveness of country life, will tend to check the flow of population into

the cities and towns and accelerate the movement "back to the farm."

Bearing in mind our universal dependence upon the farmer and the importance of good country highways as a factor in agricultural development, I believe we should, at this time, look upon the road improvement problem as one primarily concerning the farmer. His interest should be recognized in the formulation of all plans for the construction, maintenance, and regulation of the country highway. More especially this should apply to the selection of the roads which are to be first improved.

We have in the United States about 2,200,000 miles of country highways, of which only about 200,000 miles had been improved in 1909, the latest year for which complete figures are available, leaving approximately 2,000,000 miles unimproved. Hon. L. W. Page, Director of the Office of Public Roads in the United States Department of Agriculture, and the honored President of the American Association for Highway Improvement, has kindly supplied me with detailed data as to the progress of road improvement in the counties traversed by the lines of the Southern Railway Company. His figures show that these counties contain a total of 176,725 miles of country roads. Of this total, 10,321 miles, or 5.84 per cent, had been improved in 1904. In 1909, 15,298 miles, or 8.65 per cent, had been improved. In 1904, the road expenditures in these counties amounted to \$5,749,829. In the current calendar year, they will amount to approximately \$11,500,000. Assuming that the mileage improved since 1909 has been as great as that improved from 1904 to 1909, there are still about 150,000 miles of unimproved country roads in those counties. Similar conditions are found in many other parts of the United States, and it is obvious that the task before us is so great that all of the unimproved roads can not

be improved at once. Each community must decide which of its roads shall have attention first.

Broadly speaking, country highways may be divided into two general classes—those which may be denominated trunk lines, running for long distances and connecting the cities and towns along their routes, and those which radiate from a market town or shipping station. The first of these classes—the trunk line highways—afford ideal routes for tourists. There are some localities, especially those most frequented by tourists, where the construction of trunk line highways of this class is highly desirable and their improvement necessarily benefits the farmers adjacent to them. At the risk, however, of seeming to be actuated by the interest of the railways, I have no hesitation in saying that, if the greatest good is to be done to the greatest number, the farmer is more interested in the improvement of the roads of the second class which I have mentioned—those radiating from a market town or shipping station. By giving attention, first, to those parts of these roads immediately adjacent to the towns and shipping stations and extending improvements

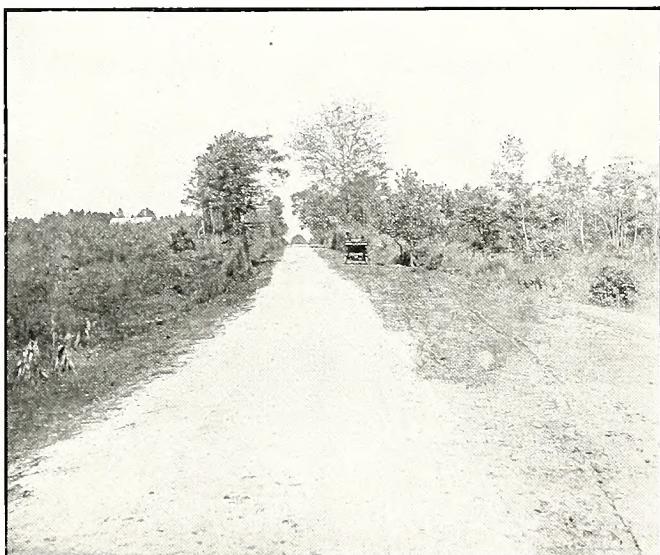
for pleasure and business. The extent to which this has grown is shown by statistics compiled by the United States Census Bureau for the year 1909, showing that in that year a total of 127,289 automobiles, valued at \$165,115,100, were manufactured, as compared with 22,830, valued at \$24,630,400, in 1904, an increase of 485 per cent. in the annual number manufactured in five years, while in the same period there was a decrease of 12 per cent. in the number of carriages manufactured in the United States. It may be that, in view of the large extent to which passenger automobiles are now used in cities and towns, a large proportion of the demand in this field in the near future will be for replacement and for improved models. We find many of the manufacturers now giving increased attention to the development of efficient motor trucks, wagons, fire engines, ambulances, and patrol wagons, and these vehicles are rapidly displacing those drawn by horses in our city streets.

Motor vehicles and traction engines are already used to a considerable extent by farmers in some localities. Looking back over the comparatively few years since the establishment of the industry and noting the improvements that have been made in the motors and the large numbers of special designs of vehicles that have been produced, we may feel sure that the manufacturers will meet the growing demand of the farmers by supplying whatever special types may be required. As an illustration of the way in which practical farmers are looking at this matter, I may mention that, within the past week, a man who contemplates buying a large farm in a region traversed by the Southern Railway told a representative of our Company that he was contemplating a location about fifteen miles back from a railway station. He said that the distance made no difference to him as the road was good and he proposed to do all of his hauling with a motor truck. What this farmer proposes to do will be done by many other farmers as the country highways are improved, and I have no doubt that the annual addition to our good road mileage will result in corresponding increases in the agricultural use of motor vehicles.

Therefore, I do not believe that in advocating the improvement of radiating roads rather than of trunk line highways, I am opposing the ultimate interests of the users and manufacturers of motor vehicles. In fact I believe that, in the near future, the manufacturers must look to our farmers for their largest opportunity for the extension of their sales.

Others who will address this congress are better qualified than I to give advice as to the types of good roads to be constructed and as to the best methods of road maintenance and management. I can not refrain from saying, however, that I believe that every one here who has seen the beautiful tree-lined roads of France will agree with me as to the desirability of planting trees by the roadside wherever this can be done without being disadvantageous. I know that a tree shading the ordinary dirt road is detrimental, as it retards the drying up of the mud after severe rain storms. I am advised, however, that shade is not detrimental to a macadam road, but is beneficial to it, and all of us who have traveled over our country roads in the heat of midsummer can realize how grateful to both man and beast would be a row of shade trees on each side of the road.

I believe, Mr. Chairman, that the difficulties in the way of highway improvement in the United States sometimes seem to be greater than they really are.



Beautiful Stretch of Road on the National and Central Highways,
Near Salisbury, N. C.

out into the country year after year as funds may become available, entire regions will, in time, be traversed by networks of good roads. Then, by connecting up adjoining systems of these radiating roads, trunk lines and through roads for tourists will ultimately be formed.

The improvement of these radiating roads will be beneficial not only to the farmer, but also to a large proportion of the dwellers in cities and towns. They will enlarge the trade of retail merchants, facilitate the work of rural mail carriers, and extend the limits within which local newspapers can be circulated on the day of publication.

Manufacturers and users of automobiles have given a great impetus to the movement for the improvement of the country highways of the United States. By devoting their time and money to this work, they have earned the gratitude of the American people, and I believe that, in considering plans for road improvement, their interests should be considered, as well as the paramount interests of the farmer.

There has been for years an increasing demand for these vehicles from residents of cities who use them

When we look at the work in its nation-wide entirety and think of our two million miles of unimproved roads, the task ahead of us seems to be so great as to be almost impossible of accomplishment, but the good roads problem, while it is national in a sense, can be solved only by the solution of the vast number of local problems which go to make it up. The immense task involved in dealing with two million miles of roads resolves itself into a large number of relatively small tasks, no one of which is impossible of accomplishment. The total highway mileage classed as unimproved includes, of course, a large number of roads which are so little used that their improvement can be postponed almost indefinitely. It includes other roads which can be maintained in a passable condition at relatively little cost and on which there is no immediate necessity for making expensive improvements. Taking these conditions into consideration and beginning first with the radiating roads to which I have referred, I believe that it will be possible for us, within relatively a few years, to have a system of improved country highways in the United States which will be of almost incalculable benefit to our farmers, and that we shall all share from the advantages of the higher agricultural development which will follow.

Within the past few years a large amount of educational work as to the advantages of good roads has been carried on in the United States. This has been participated in by the Good Roads Office of the United States Department of Agriculture, by the several states, the newspapers and the railways. The railway company which I have the honor to represent has contributed to this educational campaign by the running of good roads trains over its lines, by the distribution of literature, and by encouraging the organization of good roads associations in the territory which it traverses. As a result of this work it is no longer necessary to talk to the American people about the advantages of good roads. What is now needed is to direct the public sentiment in favor of their construction along the most intelligent lines by supplying helpful advice and

information. This is one of the objects of the American Association for Highway Improvement, under the auspices of which this congress is being held. We can all contribute to this work, each in accordance with his opportunities, and I believe that by doing so we will perform a high public service of benefit primarily to the farmer and, in the end, to all of our people.

The A. C. L.'s Good Roads Train.

Following the good example set by the Southern L. & N. and other system, the Atlantic Coast Line has started a good roads train over its system. The train left Richmond November, 24th, immediately after the closing of the Road Congress there, and before its return it will travel through Virginia, the Carolinas, Georgia, Florida, and Alabama. The train is equipped partly by the railroad and partly by the United States government, and is handled by the Coast Line without charge. It has on board the wonderful electric models used by the government in teaching the proper way to construct and maintain a model highway; a number of the highest road-building authorities of the United States will accompany it, to deliver lectures and give practical demonstrations of road-building.

The educational value of these trains can hardly be overestimated; in every case, they have left behind them a trail of good roads enthusiasts who have labored without ceasing since. Much of the amazing progress of the south along this line can be directly traced to the good influence exercised by the various railroads' good roads trains.

Ohio's delegation to the convention of the American Association for Highway Improvement at Richmond last month, travelled in two special pullman cars. The delegation stood as a unit for federal aid in the building of roads and the elimination of polities from the construction of public highways.

The District Commissioners will macadamize 13th street and Park Road in Washington, D. C.



Macadam Road, Asbury Park, New Jersey, Wesley Lake on the Right

The Delaware Highway

By GEN. T. COLEMAN DU PONT

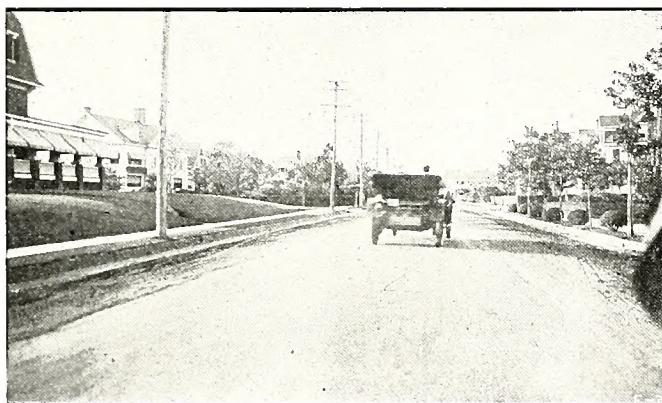
At the request of Mr. Page I am going to tell the Convention a little about "my hobby," the New Road I am building in Delaware, and the results I hope for when it is completed.

My object in building the road is not only to provide a good highway where it is badly needed and where it would run through a splendid farming section if developed and cared for, but to work out in a practical way a problem that will, if successful, (and I feel sure it will be) revolutionize the building of roads in the United States.

The problem is "How can a free country road be built and made to pay its original cost, cost of maintenance and a fair return on the money invested."

After outlining briefly my plans for the road now being constructed in Delaware, I will explain the plan I have been working on for sometime past, believing it will be of greater interest than the Delaware undertaking because it is not local, but a proposition in which all are interested.

The land acquired in Delaware will be 200 feet wide except through cities and towns where a width of 120 feet will be accepted.



Bituminous Macadam, Trapite Road, Allenhurst, N. J.
Automobile at High Rate of Speed

In building this road several materials will be used, but generally speaking, the material most available in that section will be used for making a foundation or base of concrete 5 inches deep, and on this will be built 2 to 3 inches of trap rock, or local gravel, and asphalt, thus making a first class, up-to-date road.

My intention is to make a proposition to the state to maintain the road for a period of 5, 10, 15, or even 20 years at a cost that will be less than the cost of interest on the bonds, had the state issued the bonds and built the road. My object being principally to insure the road being kept up and to show the exact cost. Such figures are hard to get at from the public records, but will be available for all interested in good roads, should I make this arrangement with the state.

My idea is to keep this road as dry as possible, and arrangements will be made with the farmers along the line of the road to clean off the snow. As soon as a storm begins a certain number of farmers will start with power sweepers. These men will be relieved at short intervals, until the snow has stopped falling and

the road is clear. In this way, one of the greatest foes of a road will be handled.

A plan for taking care of repairs and of keeping up the road has also been worked out.

Every part of the road will be gone over every other day by a road man and repairs commenced the day the road is finished, if they are needed. Not a depression nor an upheaval of one inch will be allowed to go uncared for.

Ultimately, I hope the road in Delaware will require the whole 200 feet for public use, having in the open center a strip 40 feet wide for high speed vehicles. On each side of this, say 15 feet should be reserved for electric car lines, then 30 feet outside the electric lines for vehicles, each side for travel in one direction only. On both sides and beyond these "Metal" roads, will be say 15 feet of dirt roads under which will be laid all pipes, conduits, sewers, etc., thus avoiding tearing up the "Metal" road. Beyond these dirt roads will be cement side-walks, grass and trees, or shrubbery; but to build in this way at this time would be folly, as some places where the road now runs, traffic only averages seven vehicles a day.

The day is coming when speed laws will be a thing of the past and automobiles will make 60, 80, yes 100 miles an hour on our roads carrying men to and from their daily work, thus bringing healthy country life within reach of many of our citizens.

Flying machines have come to stay, and suitable places where they can land and from which they may start will be arranged for, and this I intend to make one of the features of the road through Delaware. I hope this road will greatly improve conditions in lower Delaware by bringing modern improvements within reach of many people now cut off from them.

It was with this idea in my mind in an undeveloped condition that I asked for a right of way 200 wide, or rather the right to acquire 200 feet. In a very few years, I will have figures to show what the result will be; as, if the method suggested proves practical, it will work out in the case of the road through Delaware. However, in my case, the land is acquired from only a few, which is not entirely fair, since others who are deprived of no land will be equally benefitted by the road and improvements that follow.

In the Delaware Road I am going to utilize the extra land acquired not occupied by the road in several ways:

First, to do anything that will tend to develop Delaware.

Second, to make it easy by offering inducements for any one wanting to build a trolley line to do so.

Third, to establish at certain intervals places for the landing of aeroplanes of all kinds.

Fourth, stations for gasoline and other supplies and for repairs to vehicles, and anything needed to aid any traveler on his way.

My plan is to put the stations in the farming districts in charge of a graduate of an agricultural school, who each year will put in certain crops in the most scientific manner and who will tell the farmers as far as possible the kind of crops to plant in certain lands and who will analyze the soil and find out what kind of fertilizer is most needed for the coming crop in any particular field or what crop is best in certain soil, to

maintain a place for the grangers to meet, to keep in touch with the Agricultural Department at Washington and take advantage of its knowledge, to show by actual practice plowing and cultivation by machinery as against horse power, and other new methods of farming.

This should bring the farmers into co-operative work, for example, there are four farms adjoining, today, each one put in say 80 acres of wheat in four different fields of 80 acres each. Let them take down the fences and with a steam or gasoline engine the four could put in 320 acres of wheat at less than the labor cost, including the wear and tear on the machine, than it costs them to put in 80 acres by the present accepted method in Delaware. This economy of co-operation is equally applicable in the harvest season, with improved machinery.

In the case of this road, as it is my intention to develop the state, the income will be used to maintain these various stations and not for maintaining the road, the comparison is not an exact one, but the figures will be available and can be compared with the cost of maintenance and applied to other cases so others interested may have the advantage of them.

The good road movement in the United States is now being taken up everywhere and by all classes of people, but legislatures are slow to pass appropriations, fearing to raise the taxes of their constituents thereby making themselves unpopular. Of the farmers, "the greatest users of roads," only a few are able to see that in being satisfied with the present condition of our roads they are in reality paying higher road taxes than they imagine. In order to haul their produce to the markets and to haul fertilizers and other ne-

cessities to their farms they keep from two to four times as many horses or mules as are necessary, and frequently keep extra men to do the work caused by inferior roads.

From a number of figures compiled from different sources, the average load drawn by two horses or mules on our unimproved roads is about 960 pounds, and the average distance from far into market, 12 miles. The average day's work for two horses is 12 miles a day on these roads. On the French roads, for comparison, one horse takes a load of 3000 pounds 18 miles any day in the year. If our farmers would count as road tax, the extra amount they pay to maintain horses, men, wagons, and harness to make up the difference between what they now haul and what they would haul on a good road, they would refuse to vote for any representative or senator for the state legislature, who would not promise to reduce their expenses by voting for a liberal appropriation for good roads, for the absolute maintenance of them at all times, or in case of the plan hereinafter described, vote to lend the credit of the state for such time as may be required.

I was much surprised a few weeks ago in talking to a man at the head of a department having charge of many miles of roads, to hear him say that "after a road was built properly, it required absolutely no expense for maintenance for three or four years." This remark points to one of the greatest mistakes in regard to American roads, for in many of our state roads are built with absolutely no provision for their up-keep, the consequence being after a few years they are really worse than the original dirt road and cost about as much to repair as to build a new road.

One could go on indefinitely in the above strain, vol-



Trunk Line Road, Lake Chocorna, N. H.



Sand Clay Road Near Salisbury, Rowan County, N. C.

umes have been written on the subject, but what the Ameriean people want is a way to build roads economically and quickly without a greatly increased tax on their resources.

Now for the problem "How ean a free country road be built and made to pay its original cost, cost of maintenance and a fair return on the money invested?"

The following plan, I believe, could be adopted successfully in most of the United States, east of the Mississippi river and in a good many places west of it, in fact wherever the population be a producuing one. This plan would provide funds for building the road, maintaining it, and subsequently repaying to the state or corporation building it, all the interest and principal and a good return on the investment. When this is done there will be left a tangible surplus, the disposal of which will be suggested later.

Assuming that each state has passed the neecessary legislation and provided the proper organization or comimssion to carry out its purpose, then suppose a road is wanted between two towns, say 15 miles apart. This would be ascertained by submitting the question to a vote of the people owning the land, one vote for each acre owned, say five miles each side of the suggested route. The route should be as nearly straight as possible. The vote should be by acres. If a majority of the land owners (in acreage) vote in favor of the road, the fact of the favorable vote would automatically constitute the right to build the road. Land could be condemned if neecessary, and the road laid out, say 250 feet wide. The people on the line of road would give all the land, namely, 250 feet, but the ratio between the benefits that would accrue to the donors would be equalized as follows: Those within one mile would contribute only 30 per cent of the land, the owners of land between one mile and two miles 25 per cent, between two and three miles 20 per cent, three and four 15 per cent, between four and five 10 per cent, of the 250 feet, total 100 per cent. While those whose land the road passed through would give 100 per cent, they would be repaid 70 per cent the next one would be repaid by the next 75 per cent, the next 80 per cent, etc., this adjustment having been made by a commision. The act authorizing the building of the road would carry the power to adjust, condemn, and all other power required by a commissioner elected or appointed for the purpose. Inasmuch as the person whose land is taken at today's price and paid for at the value the day he is paid, the division above may not be neecessary, because being repaid for his land at the advanced price usual to follow the development would be enough

of an inducement for him to give up the use of the land until such a time as he was paid for it; but should it deprive the owner of too much land, the division into 30, 25, 20, 15 and 10 per cent. is suggested. Then bonds, guaranteed by the state, both principal and interest, would be issued on this 250 feet and the proceeds used for building the road, and paying earrying charges. The entrances to properties would be 150 to 200 ft. apart or the distance between streets and alleys in the nearest town.

The road would be built at first say 20 feet wide, then 30, then 40, then 50 as the growth of the section warranted. As the country grew and developed, the strip on either side of the road would become more valuable for every purpose, trolley lines, telegraph, telephone, sewers, rights of way in and out of adjoining properties, etc., etc.

The income from that part of the land not needed for road purposes, until such a time as required for public service, such as telephone, telegraph, trolley lines, and other public utilities which would pay a rental in proportion to their earnings, would be used, first, for maintaining the road in an absolutely perfect condition. For this the state might have to make the Road Building Commission a temporary loan. The period of not being self-sustaining passed, the incomes would be applied, (after maintenance), to interest, then to paying off the bonds issued for construction. After the bonds are paid the income will be applied to paying for the land acquired at its value the day it is paid for by the road commission. After this, toward paying county and state debts, etc., the returns can be distributed to the share-holders who gave land as their interest may appear, but this income, should it go to the land owner, should be bought and sold with the land just as a spring of well known water goes with the land. That is, selling the land would pass title to the stock or the excess could be used for extending the road. One suggestion would be that when the income reached a point when every one was paid in full, the property could be made to pay less interest, by turning part of the earning strips into boulevards and drives for beautifying the cities through which it runs. This is probably the best solution, but whatever the solution it should be broad enough to allow building charitable institutions, more roads, or for any other use that seemed best at the time, or even follow the example of the Delaware road and establish stations for bringing before farmers and others the latest known methods as applied to agriculture.

There would be about 26 aeres per mile of land for

various uses. This should rent at from \$5 to \$10 per acre from the first for agricultural purposes, and create an income of from \$130 to \$260 per mile, which would easily maintain the road the first few years. At the start the state might have to pay part of the interest, but as the town grew, and the country developed the rental for this 100 ft. on either side would soon advance to a point where the income would be ample for maintenance and interest, and after that the bonds could be taken care of. If any of those present will look back 25 years and note the value of land along an important road at the edge of the city, or even in the city now, as compared with that same value 25 years ago, it will at once be apparent that the income would soon be a valuable asset to the state, county or to the builders of the road. Suppose this idea had been put into effect when Broadway, New York, stopped at Canal street. What would the income (ground rent) from 100 feet each side of Broadway from Canal street to Yonkers be? In some places the income would exceed one million dollars per mile. A road built under these plans would be maintained in perfect condition always by this income, it would be a good road, the land along it more valuable, more desirable, and therefore bringing in sooner than usual, returns worthy of most care-

ful consideration, always keeping in mind that the road must be in perfect condition with penalty for neglect. This is important.

To refer again to the income from the land alongside of the road, where the value of the land is likely to increase rapidly, it might be well to issue more bonds in the first place and pay for the land then and there so that when the road became self-sustaining and the income was increasing rapidly a block that had large earning power could be followed by a block which would be a park and on the line of this road the commissioners might alternate a paying block and a park, depending entirely upon the earning power of the land alongside, but I believe the income spent in this way would in the long run be better than to pay dividends to contributing land owners. However, in each section of the country this problem would have to be treated by the desire of the people in that section.

This plan is one that will require a good deal of thought and to put it in more detail would, I am afraid, tend to confuse rather than enlighten my audience, but this will be followed in the near future by figures given from the results of the experiment in Delaware.

The Split Log Drag---How to Build and Use It

By MR. LEONARD TUFTS

FIRST: Build a drag according toents herewith, using a split log or 2 piece 3in.x8in., or 3in.x10in., 7 or 8 feet long. We prefer to run the iron the full length of the front scraper.

SECOND: Hitch a pair of good horses or mules to it; attach the double tree at a point in the chain that will compel the drag to follow the team at an angle of about forty-five degrees, with the left hand end of the drag to the rear; and when the road surface soil is moist, but not sticky, step on and drag on the right hand side of the road for ten miles and then turn around and come back on the right hand side.

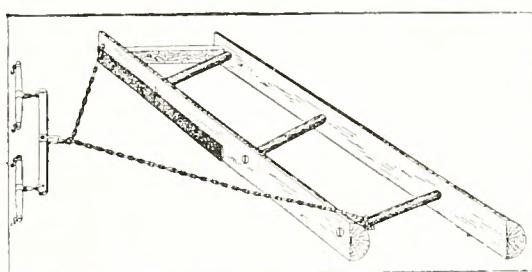
HOW TO USE A KING ROAD DRAG ON SAND-CLAY, GRAVEL AND TOP SOIL ROADS THAT HAVE BEEN CONSTRUCTED.

The surface of a sand-clay, gravel or top soil road, after use, has only been made compact an inch or so down. Any machine, such as a road machine, is almost sure to tear up this compact surface and leave it the same loose mass as when first built and this will soon

expect that one dragging will put a badly rutted road in good condition, and don't drag a road more than once or twice after each rain or it will tear up the hard surface. Drag the road only when it is wet for you can only get the "slicking" action then.

After a heavy rain the water running off the surface of a road makes little trenches which run off at right angles with the road. If the drag is drawn at right angles with the road it drops into each little trench and instead of filling it up digs it out. The drag should therefore be drawn at an angle with the road, and it will then fill up the trenches. (Let the edge of the drag run over the gutter so as not to allow the shoulders to become the highest part or make a ridge for the next rain to run in and in this way make a second side ditch and narrow the road.

If the road has too much crown; First, every team will drive in the middle as no man will drive on the side if it places him at an uncomfortable angle. Second, the rain in running off the road will make deep trenches at right angles to the road. To correct this, draw the drag at right angle to the road in the middle so as to cut down the crown and throw the dirt both ways towards the gutters. If the road has not enough crown the water does not shed off quickly but soaks in and makes the surface soft. To get greater crown the driver should stand on the gutter side and towards the front. In this way it takes the dirt from the sides and pushes it towards the middle. The slope of the crown should be 1 to 20 and so on a 15 foot road the edges should be $4\frac{1}{2}$ in. lower than center. If there is a place in the road that is all right the driver can step back on the drag and only a very small amount of dirt will be moved. After a little experience the driver will find, by moving from one point to another, that he can move the surface of the road as he wishes. An intelligent and experienced man can do wonders with one but any kind of dragging will do good.

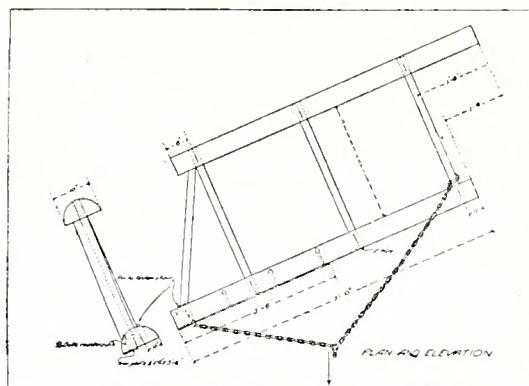


United States Model King-Drag

be full of holes and ruts from traffic. A road drag should be made light so that it will move a little of the surface at a time and also so a pair of mules can pull it. If a little is moved after a rain with a drag the drag "slicks" the surface like a plasterer's trowel. Don't

The drag is useless in sand beds and on maeadam. To do the best work with a drag the ditches, if there are any, must be kept clear of rubbish and sand. Throw this sand away from the road, unless the road gets muddy in wet weather—due to clay—when it sometimes is advisable to put it in the road.

Outside of the obvious advantage of keeping the road smooth and shedding off the water, a road drag has the advantage, where properly used, of covering up the ruts so that a mule or horse is as liable to go



United States Model King-Drag—Plan and Elevation

in one place as another and therefore all portions of the road are travelled and packed alike. If used frequently it keeps down the grass and bushes at the sides so that a driver, if he has to turn out, can see where the edge of the road is.

FIRST: A road drag should be made light and should only move a small amount of dirt after each rain.

SECOND: The drag should not be drawn at right angles to the road except to cut down the crown.

THIRD: An experienced man can move the surface of the road as he wishes by moving his weight from one point to another.

FOURTH: Let the edge of the drag extend over the gutter.

FIFTH: The drag is useless in sand beds and on maeadam.

SIXTH: Where ditches are necessary they must be kept clean and the sand thrown away from the road.

SEVENTH: A road drag keeps the road smooth and if properly used the road will shed the water.

EIGHTH: The mules on a properly dragged road travel all over it and pack the whole surface.

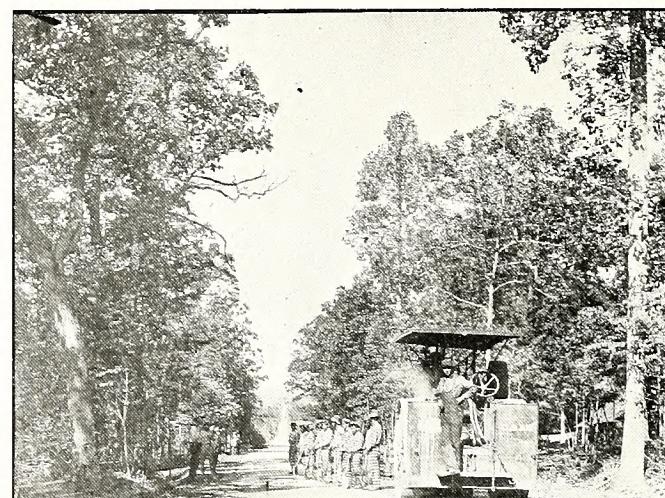
NINTH: It prevents the bushes and grass from growing on the sides.

Concrete Highways.

In Wayne county, Mich., the county in which Detroit is situated, concrete roads are rapidly coming into favor. Concerning them the last report of the Wayne county highway engineer has the following to say:

"The work during the past year has been in a large measure a carrying forward of the work of 1909, but has been a departure from the methods at first employed, in the practical abandonment of the building of maeadam roads. We speedily took note of the world wide cry, 'What shall we do to save our maeadam roads from the ravage of the automobile?' and blazed the way for a new type of roads, viz., concrete. With no preconceived idea on the subject and unhampered by precedent and convention we quickly found that what was happening to the maeadam roads of the Unit-

ed States, Continental European countries and the United Kingdom was also happening to the maeadam roads built by us, and we could foresee a constantly increasing maintenance cost similar to that found in England and France, where the cost has jumped from about \$25 per mile per year to about \$475 per mile, and is still advancing. We thereupon set out to find a more permanent and durable material which would approximate in first cost that of a maeadam road, and the result has been the adoption of concrete for most of our county roads. In a sense, the idea is not original with us, concrete having first been used in this country in Bellefontaine, Ohio, on some of the leading streets as early as 1893, which are in good condition today, with practically no maintenance charges against them. Other communities throughout the country have laid experimental concrete streets and roads which, in all instances, are giving satisfaction. We have devised numerous improvements in the detail of the specifications and methods of building concrete roads and believe that we have come near to solving the question of good country roads that are low in first cost, low in maintenance cost, durable, dustless and sanitary. We are building concrete roads at a much lower cost per mile than New York, Pennsylvania and other states are building or-



Macadam Road in Rowan County, Near Salisbury, North Carolina
Built by Convict Labor

inary macadam roads. Last year we built a little over two miles of concrete, with a view to determining its practicability in this locality, and Woodward avenue road, which carries an enormous traffic, has been in use nearly sixteen months now, during which period it has not been touched by way of maintenance work, in this respect fully meeting our expectations. The other experimental roads of concrete show the same results, although they have not been in use for as long a period as Woodward avenue road, and unless the future shows marked defects, we shall use concrete as a standard type of construction.

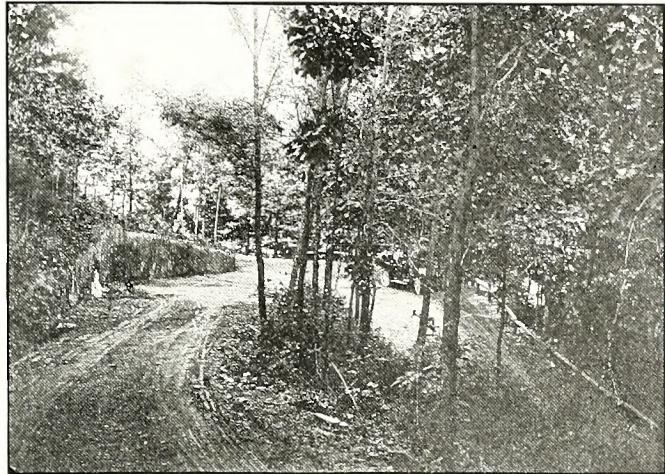
"We have been the recipients of many communications and have been visited by numerous delegations of interested road engineers, commissioners and other public officials and private citizens who have heard through various channels what we are doing, and many are preparing to do some road work along similar lines. We have completed and under way at the present time about fifteen miles of concrete roadway."

The city of Birmingham is paving Eighth avenue.

Auto Road to the Summit of Sunset Mountain

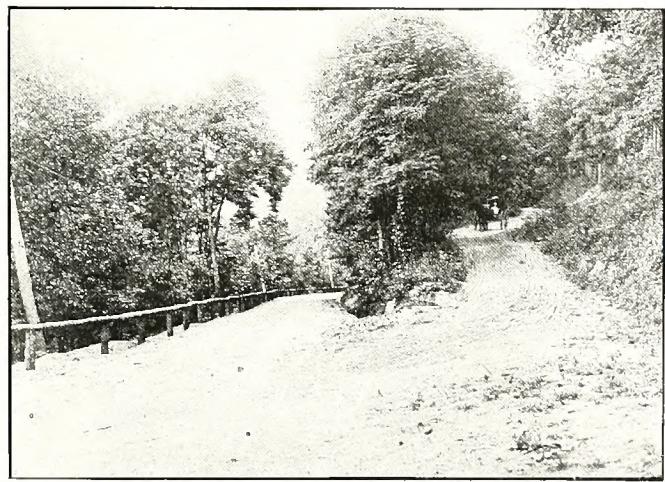
By MR. N. BUCKNER

An exclusive automobile road, nearly all of which is three per cent grade, with none greater than five per cent, beginning at the foot of Sunset Mountain near the end of Charlotte street, Asheville, N. C., and winding around the face of the mountain to its summit, has just been opened to the public by Dr. E. W. Grove. The entire length of the road to summit has been laid with macadam and repeatedly rolled until



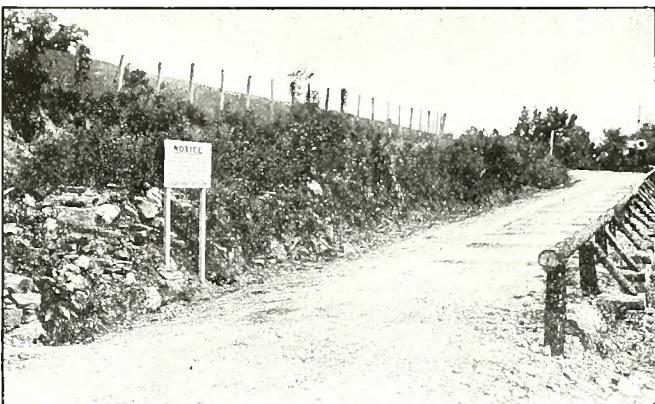
A Charming Drive on the Estate of Dr. E. W. Grove
Near Asheville, N. C.

its surface is as smooth as a floor. The road is of sufficient width for speeding motors to pass at any point. There are signs at approaches to all curves to "Blow Horn," while at the entrances to this road, and at its intersections with the carriage road that also leads to



One of the Beautiful Mountain Roads in Buncombe County,
Near Asheville, N. C.

summit, are signs giving notice that carriages are not allowed on this road. The carriage road over a different course also has signs advising the public that automobiles are not allowed on it. The distance from the center of the city to the summit over this road is five miles, and motoring over its smooth surface presents to the eye views of rare sublimity and grandeur. At each turn of the road, and all along the mountain-



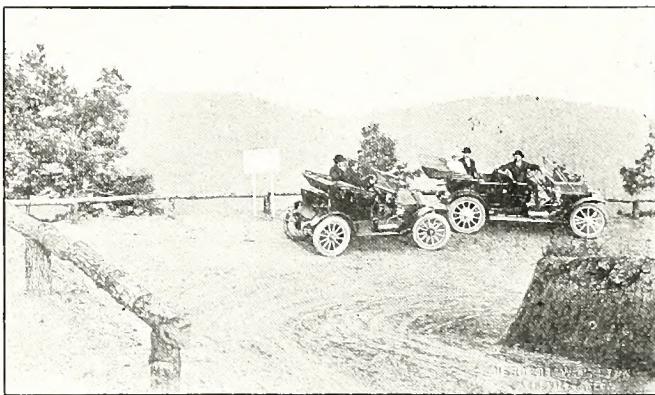
Improved Road on the Beautiful Estate of Dr. E. W. Grove, Near Asheville

side are delightful vistas that stretch away to the north and west, glimpsing the beautiful French Broad River, whose Indian name is "Tahkeeostee" meaning



A Beautiful Mountain Drive on the Estate Dr. E. W. Grove, Near Asheville

"Racing River," with Asheville in the foreground. The consummation of the tourists' enjoyment is attained when the summit of the mountain is reached. Here,



Beautiful Mountain Drive on the Estate of Dr. E. W. Grove, Near Asheville

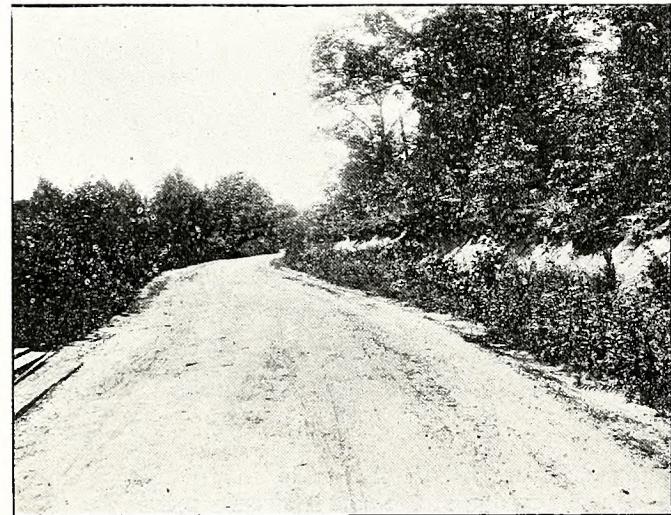
at an altitude of 3119 feet above sea level, is a spread of vernal beauty that encompasses rare delights of valleys and summits, and in the full sweep across the

Asheville plateau there is a world of tranquil grandeur, and a loveliness of setting that stretches away to the far off mountains in the west where the majestic peaks of Pisgah, Richland Balsam, Cold Mountain, and the Bald pierce the sky at altitudes of 5749, 6540, 6000 and 4500 feet respectively, with a dozen others ranging in height from 3100 feet to 5000 feet.

Road Improvement in South Carolina

By HON. F. H. HYATT, President South Carolina Good Roads Association

I have been President of the South Carolina Good Roads Association for the last twelve years, and when I look back and see the progress that we have made it seems marvelous. Twelve years ago, when the association was organized, we found but little on the statute books which was of aid to the supervisors of those in charge of the roads. At that time I was on the board of Richland County Commissioners, in which county the Capitol of South Carolina is located. When we began to improve our public highways we found very strong and bitter opposition; so much in fact that the matter went into county politics and a delegation was elected to the general assembly opposing improvements



Clemson College, S. C. Granite Macadam Road

of public roads. A bill was introduced, which was passed by a free conference and referred to the governor for signature, he vetoing same. By so doing he continued the county commissioners at that time in office for two years, and at the expiration of that period we had convinced the general public that we could build roads economically with sand and clay in Richland county, therefore, all opposition was withdrawn, and in the last ten years Richland county has made wonderful strides in building her sand and clay roads, which, in my judgment, is the most economical and practical road built, in this section of the country at least. We found that macadam was too expensive and too hard to keep in repair, but with the sand and clay road, if same is kept well drained and a simple log drag is used occasionally there will be no trouble. This

Address delivered at the Mid-Summer Convention of the South Carolina Good Roads Association, held at Spartanburg, August 7-8, 1911.

This five mile stretch of road from the center of the city of Asheville to the summit of Sunset connects with the Crest of the Blue Ridge Highway, running from Asheville to Blowing Rock, and passing Mt. Mitchell, 6711 feet high, within a few hundred feet of its summit.

system of road building has been adopted all over this state and in various other states, where the two materials, sand and clay, can be gotten conveniently. We find that where sand and clay are within close range of each other these roads can be built for about \$500 per mile.

I saw on exhibition the other day a gasoline engine pulling three large road machines. The stumps, roots and rocks had been removed out of the roadway, and after having made only one round with this engine attached to the machines the road was put in proper condition for the application of the sand and clay. By this method, miles of road can be prepared per day, and at a very small cost.

It has been a question in my mind for sometime as to what is the best method to adopt to obtain money with which to build roads, there being two or three methods practiced in this state, one of which is special levy and another commutation tax, or, in lieu thereof, free labor or the bond issue.

On the best authority that we can get from the U. S. government there is being spent annually at this time about \$1.05 per capita, or, in other words, about \$95,000,000.00, upon our public highways, and, I am sorry to say, for the want of competent men to handle this money at least one-half of it is mis-applied. From the best information that I can get in South Carolina, we spend about 50 cents per capita, or about \$800,000 annually for good roads, and I am satisfied that the methods which have been adopted by the majority of our supervisors who have not built their roads from a scientific standpoint nor consulted the aid of a civil engineer, but have undertaken to build roads and bridges without having any practical knowledge as to that line of work, have failed, and consequently wasted a great deal of money. We have a few bond issues in this state, represented by several of our counties. I would be in favor of bond issue if we could feel sure that the money would be used intelligently, but, to turn over from one to five hundred thousand dollars to inexperienced men for the betterment of our public roads, without the guidance and direction of a civil engineer, I am frank in saying that I think we take a great risk.

Some of our leading states in the north and east are making large appropriations for their public highways. For instance, New York state began in 1899 and has given out money with a lavish hand. Up to 1905 she had expended about four and a half million dollars, then came the bond issue of fifty million more to be expended in seven years. Pennsylvania began the good roads movement in 1903, with an appropriation of \$500,000.00, and by 1909 \$5,700,000.00 was being spent, or, since 1903 has expended about \$20,000,000.00. We might go on to enumerate what various other states

have done along this line but for the fact that it would take too long and is too tedious.

Government Aid.

There has been a great deal said about the U. S. government coming in and building our public highways, especially the routes over which the rural free delivery is carried. Senator Lattimer and I canvassed this state several years ago, discussing the good roads movement, and he at that time advocated the government aid very strongly, but on every stump in South Carolina, and in every other state that we visited, I insisted upon every state getting busy and building their



Yorkville, S. C. Sand Clay Road Two Years Old

own roads; that it was a question in my mind as to whether the government would ever undertake this work, notwithstanding that we find on looking back that such men as John C. Calhoun, John Quincy Adams, and even up to our former president, Theodore Roosevelt, all spoke of the advisability of the assistance of the government in building our public highways. But, if the government should decide to appropriate so much money annually for South Carolina today, we are not in a position to receive said money, as we have no state highway commission which could be gotten in touch with in a legal manner.

Mileage.

It is estimated that we have about 2,000,000 miles of roads in the United States. In South Carolina we have about 42,000 miles of roads, not over 20 per cent of which is improved, but, I am glad to say that every county is now organized and each one is building roads in accordance with the best materials, etc., they have before them, and, as they conceive, systematically and scientifically; but wherever a half dozen convicts can be gotten together, these convicts are expected to build their roads, and do it right away. The general impression seems to be that roads can be built, with the assistance of only ignorant labor of this kind, but in my mind it is utterly impossible. We are now working upon our public highways convicts who have been sentenced for as long a period as ten years, but are only able to secure a part of the convicts for this work as a great many of them are used in the hosiery mills and on the state farms.

Progress of Our State.

South Carolina today leads all other states in the possession of scientific farmers. We have produced more corn per acre, more cotton per acre and more

oats per acre than any other state. We stand first in the amount of wealth produced per square mile. We have increased within the last ten years the gross income of our field crops from \$51,000,000.00 to \$140,000,000.00. We have doubled our income in the last five years and increased same to the amount of \$31,000,000.00 in the last twelve months.

Population.

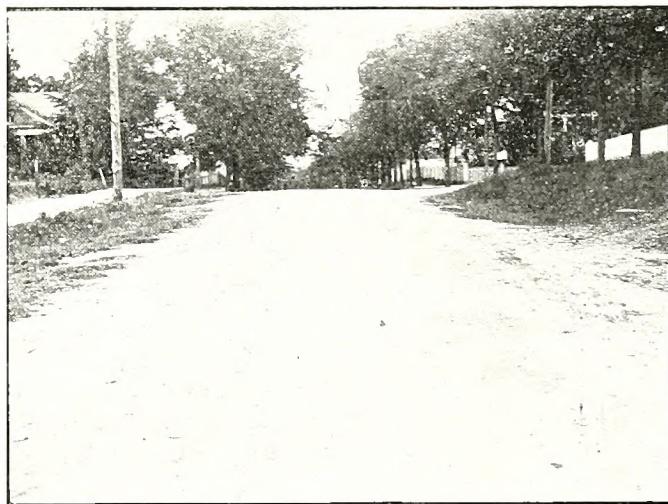
The U. S. census, which has just been reported within the last few days, shows that 82 per cent. of our population reside in the rural districts, and I claim that the development of our public highways is as much, or more, the cause of people remaining in the country than any other one thing.

I wish to state that I have visited practically every state in the union and do not hesitate to say that, in my judgment, there is no state that has a brighter future than South Carolina today. She stands second in the number of spindles manufactured; she stands second in the amount of phosphates produced and second in the amount of rice produced. She stands first, as I have said before, in production per acre, and there is no state in the union that is making greater strides along the lines of general development and education than is South Carolina today.

As we all know, South Carolina is one of the old historical states, a hot bed of events, and when it comes to a show-down can cut up more ~~h~~ to the square inch than any state in the union. She is one of the thirteen states which have produced some of the greatest men of the age, and I want to say to her people that there is no reason why we should not continue to hold our prestige and improve upon it.

Chase Rabbits for the Cause of Good Roads.

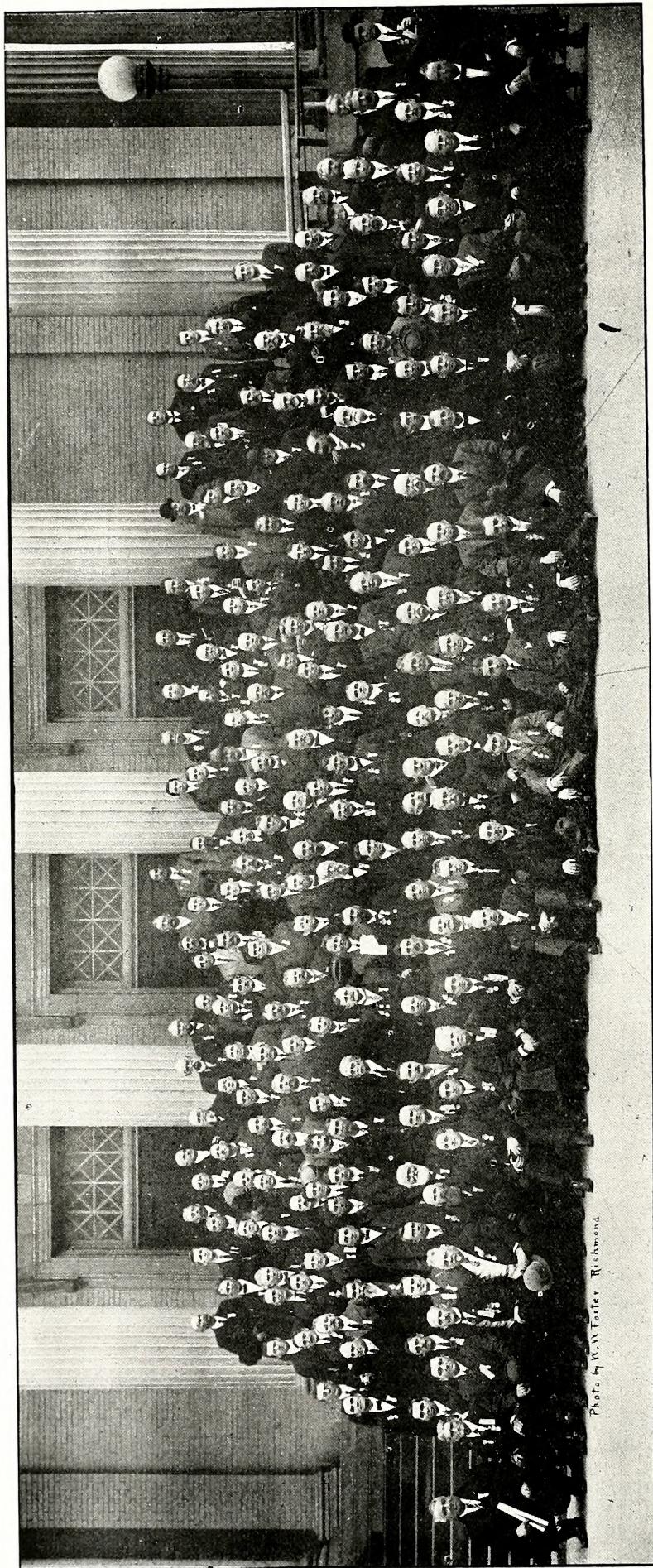
Fort Dodge, Iowa, citizens have hit on a novel plan for raising money to build better roads with. They have issued announcements for a big jack rabbit hunt.



Sand Clay Road Built Two and a Half Years Ago. Winnsboro, S. C.

The good roads association will secure jack rabbits and a pack of hounds. Hunters will be charged an entry fee and the money which is thus raised will be devoted to the good roads movement in and around Fort Dodge.

The Galveston, Texas, County Commissioners have approved an extension of the seawall boulevard through the Fort Crockett reservation.



First American Road Congress, Richmond, Virginia, November 20-23

The Richmond Convention

The first annual convention of the American Association for Highway Improvement, which was held in Richmond, Va., November 21-23, was a success in every department and will go down in history as the greatest good roads gathering in the history of the movement. A big disappointment of the occasion was the absence of President Taft, who was to have made the opening address. The president was confined to his room with a severe cold and his physicians thought it best for him not to make the trip to Richmond. He sent as his representative, Secretary James Wilson of the United States Department of Agriculture.

To Mr. Logan Waller Page, president of the association, President Taft sent his regrets. The president's message was as follows:

The White House,
Washington, D. C.,
November 19, 1911.

L. W. Page, President American Association for Highway Improvement:

I have had a cold for a week since I returned from my trip, and have spent the last forty-eight hours in the house, with the hope of being able, without risk, to go to Richmond tomorrow. I have been looking forward to taking part in the good roads convention with a great deal of pleasure, because I am in sympathy with the movement that is gaining strength in every state and in the nation for the promotion of the construction of permanent good roads.

The effect that they will have in increasing the value of farms, in making the lives of farmers and their families much more full of comfort, and in the general benefit conferred by greater ease of intercommunication the country over, cannot be exaggerated.

I wish that I could be present to utter my word of approval and encouragement, but I feel that the trip as planned, is one which would involve more risk than I ought to incur in my present condition. I have postponed this announcement until now, with the hope that I might avoid making it. The pleasure of receiving the hospitality of Richmond, which has been mine at least twice, lingers long in my memory, and makes me deeply regretful that I must deny myself now the enjoyment of the trip.

(Signed.)

WILLIAM H. TAFT.

Mr. Page sent the following reply:

Richmond, Va., November 19.

The President, Washington, D. C.:

We deeply regret that you are unable to be with us and sincerely trust that your illness will be of short duration.

L. W. PAGE.

The convention was held in the auditorium of the Jefferson Hotel. On the opening day there were more than 500 registered delegates in attendance. About 300 more came in later, making the total attendance about 800. The big auditorium was lavishly decorated with bunting and flags, which imparted to the scene something of the appearance of a big political convention.

Governor Mann, of Virginia, made the first address of welcome and in the course of his very eloquent speech he advocated the employment of the convicts of Virginia on the public roads and he promised to recommend it to the legislature, which meets in January.

Mayor Richardson, of Richmond, followed with a fine address of welcome in the course of which he took occasion to boost the good roads movement and especially the Quebec-Miami Highway.

The address of the president of the association, Hon. Logan Waller Page, which came next, was a stirring appeal for a campaign of education in all parts of the country.

"It is necessary," declared Mr. Page, "that a thorough campaign of education be conducted in every locality where the burden of bad roads hangs like a millstone about the necks of the people. In this campaign of education, three things are essential: First, that your work must have a definite object; second, that your plans must be practicable, and third, that they must have intrinsic merit."

In conclusion Director Page landed the loyal and spirited support given the movement by the railroad companies. "It is immaterial whether they are actuated by wise foresight, or whether they have the welfare of the people along their lines solely at their heart," he said, "the fact remains that they are doing a work which benefits every man, woman and child within the zone of their influence, and full credit should be given to them for it."

Senator Martin, of Virginia, created no little enthusiasm when he declared vehemently that he was opposed to Virginia's convict lease system. He said that the time had come for Virginia to do away with it and put the convicts on the public roads. He also put himself on record as favoring federal aid in highway building, calling for \$50,000,000 appropriation annually from the national treasury, to aid in the work.

Hon. W. W. Finley, president of the Southern Railway Company, discussed the question of good roads as it relates to the farmer in a very interesting manner. His address appears elsewhere in Southern Good Roads this month.

Congressman J. Hampton Moore, president of the Atlantic Deeper Waterways Association, made a strong speech favoring the improvement of the highways and waterways of the nation, declaring that both have been neglected. His address closed the program for the morning.

Secretary Wilson, the official representative of President Taft, arrived at noon and was met at the station by a reception committee composed of Governor Mann, Mayor Richardson, President Wood of the Richmond Chamber of Commerce and Col. Benehan Cameron, of North Carolina. His speech was the principal feature of the afternoon session. Good roads as related to the cost of living formed the substance of his address. He declared that the cost of living could be materially reduced by the establishment of more intimate relations between the producer and the consumer.

"Relations between the farmers and townfolks can be established," he explained, "for the prompt transfer daily or weekly of much that the farmer produces and town people consume. At present when the town dweller pays a dollar, the farmer gets half or less. With parcels post the farmer would get more, the carrier would get his freight, and the consumer would get his supplies promptly, fresh and good. Dairy products, fruits, meats and vegetables are transferred in this way in other countries, with great satisfaction to all

concerned and with less unhealthy food, fewer ptomaines and less frequent stomach troubles."

General T. Coleman Du Pont, of Delaware, followed the distinguished secretary of agriculture, with a description of his great trans-Delaware highway. His address appears in this issue of Southern Good Roads.

Hon. Walter Page, the editor of *World's Work*, was the first to raise his voice against federal aid in road construction. He spoke after General Du Pont. He told the delegates of the wonders accomplished in Mecklenburg and Moore counties, North Carolina. He said that the movement had reached a point where it is beyond governmental aid.

In the evening a brilliant reception was tendered the delegates and visitors by the city of Richmond and the Chamber of Commerce in the parlors of Jefferson Hotel.

A meeting was held late in the afternoon to organize the Quebec-Miami Highway Association, at which Hon. Joseph Caron, minister of agriculture of the province of Quebec, Canada, made a notable address.

Road-Builders' Day.

Tuesday was "Road-Builders' Day and there were strong speeches by a number of the leading engineers of the United States and of Canada. Hon. Harold Parker, former chairman of the Massachusetts Highway Commission, presided over the meeting and addresses were made by W. C. McLean, provincial engineer of Ontario, Canada, on "Macadam and Gravel Roads;" P. St. Julien Wilson, state highway commissioner of Virginia, on "Sand Clay and Earth Roads;" W. W. Crosby, state highway engineer of Maryland, on "Bituminous Roads;" Edward Orton, dean of the Engineering Department, Ohio State University, on "Brick and Other Road Materials;" Arthur H. Blanchard, professor of Highway Engineering, Columbia University, on "Road Cost and Maintenance;" A. N. Johnson, state highway engineer of Illinois, on "Highway Bridges." Other features of the day were addresses by Mr. Onward Bates, president of the American Society of Civil Engineers, Capt. D. L. Hough, president of the United Engineering and Contracting Company, Nelson P. Lewis, chief engineer of the board of estimates and apportionment of the city of New York, J. B. Girard, territorial engineer of Arizona and Senator John A. Bankhead, of Alabama.

While the delegates were going ahead with their work, discussing the various phases of road-building in all parts of the nation and in Canada, the committee on resolutions, composed of fifteen men, was deeply engrossed in the work of framing resolutions that would express the sentiment of the convention. This committee was composed of the following men:

Chairman, T. Coleman Dupont, Delaware; Leonard Tufts, North Carolina; Jesse Taylor, Ohio; A. W. McLean, Toronto; J. A. Stewart, New York; W. W. Crosby, Maryland; W. D. Sohier, Massachusetts; Mr. Norris, Arizona; Mr. Potts, Texas; W. J. Roberts, Washington; P. St. J. Wilson, Virginia; R. A. Meeker, New Jersey; Colonel Suggs, Oklahoma; Dr. J. H. Pratt, North Carolina; A. N. Johnson, Illinois.

Federal Aid.

The committee spent a large part of its time discussing federal aid in road-building and every phase of the question was threshed out. When it came time to vote on the committee's recommendation, there were but two votes against it. There were no such scenes as those pictured by enterprising newspaper men over the question of federal aid and the story that went

out over the Associated Press wires, telling of the terrible split among the delegates, was entirely false.

The sentiment of the delegates at large on the question was expressed in no uncertain terms while the committee on resolutions was still out studying the question. In order to test the feeling of the delegates a resolution calling for federal aid was put to the house and was carried unanimously, by a standing vote.

Road Users' Day.

Wednesday was Road Users' Day and the exercises of the day were held under the auspices of the Touring Club of America. Col. William D. Sohier, Massachusetts Highway Commissioner, presided. President Belvin, of the Virginia Automobile Association, delivered an address of welcome. The following subjects were discussed:

Traffic Rules and Regulations, Major Richard Sylvester, of Washington, president International Police Association; superintendent Metropolitan Police, District of Columbia.

Motor Vehicle Law of Massachusetts, Colonel William D. Sohier, of Boston.

Review of the Automobile Industry—What It Has Done for Good Roads, Colonel Charles Clifton, of Buffalo, president Automobile Board of Trade.

A Model State Motor Vehicle Law, Edward Lazansky, Secretary of State of New York.

The Motor Vehicle Law of Connecticut, Matthew S. Rogers, secretary of state of Connecticut.

Forecast of the Automobile Industry, Hugh Chalmers, Detroit.

The Rights of Road Users in America Learned from Europe's Lessons, David Recroft, Chicago.

The Illinois Motor Vehicle Law, Sidney S. Gorham, Chicago.

Quebec-Miami Highway Project, H. D. Hadley, chairman McDonough Club, Plattsburgh, N. Y.

Association Day.

Thursday, the last day of the convention, known as Association Day, was devoted mainly to the question of using convicts on the public roads. Dr. Joseph Hyde Pratt, state geologist of North Carolina, presided. Dr. Pratt's speech on "The Use of Convict Labor in Road Building" aroused a great deal of enthusiasm among his hearers.

Ex-State Senator Charles T. Lassiter, of Petersburg, Va., spoke interestingly of road reform in Virginia. Others speakers of the day were:

Jesse Taylor, secretary of the Ohio Good Roads Federation; W. D. Brown, editor, R. F. D. News; Leslie T. McCleary, of New York, representing the Lincoln Memorial Highway Association; Dudley Field Malone, of the National Highways Protective Society, of New York; representatives of automobile associations, National Civic Association, and others.

Active Campaign for Federal Aid.

The convention decided on an active campaign for federal aid in road-building and provision was made for the appointment of a strong central committee to take charge of the work of convincing congress that federal aid is essential. It is planned to have this committee secure headquarters in Washington and carry the fight to the capitol.

At a directors' meeting held during the convention action was taken to secure joint conventions in the future, of American Association for Highway Improvement, the American Automobile Association, the

American Road Builders' Association and the National Association of Road Material and Machinery Manufacturers—the four giant organizations of the road building world. It was agreed by the representatives present to recommend to their respective directorates favorable action toward the co-operation suggested, and to request the appointment of a committee of two from each body, to meet and work out the details for each corporation, the results to be submitted to each directorate for final action.

The significant thing behind this agreement, it is said, is the fact that each of the bodies has separately declared itself in favor of governmental aid for highway improvement and will join hands in this joint convention, in order to present more forcibly than could be done if each met as a separate body, the combined sentiment and demand of the American people on this point. It will be a solid alignment of all road interests on a federal aid platform.

The Election of Officers.

The closing session of the convention was taken up with the election of officers. The following were chosen without a dissenting vote:

President, L. W. Page, Washington, D. C.; vice-president, W. C. Brown, New York; treasurer, Lee McClellan, Washington, D. C.; secretary, J. E. Pennybacker, Jr., Washington, D. C.; organizer, Charles P. Light, Martinsburg, W. Va.

The following were elected directors: B. F. Yoakum, Dr. E. J. James, James McCrea, Bryan Lathrop, Chicago, Ill.; John M. Goodell, New York; Walter H. Page, New York; Leonard Tufts, Pinehurst, N. C.; Lee McClellan, Washington, D. C., for three years; John A. Stewart, New York; W. W. Finley, Washington, D. C.; Joseph W. Jones, New York; James S. Harlan, Washington, D. C.; A. G. Spalding, Point Loma, Cal.; Archibald H. Huston, Columbus, O.; Alfred Noble, New York; L. E. Johnson, Roanoke, Va., for two years; George C. Diehl, Buffalo; W. T. Beatty, Chicago; Thomas G. Norris, Phoenix, Ariz.; J. Hampton Moore, Philadelphia; T. Coleman DuPont, Wilmington, Del.; J. J. Duff, Washington, D. C., and Robert P. Hooper, Philadelphia, Pa., for one year.

The matter of choosing a meeting place for next year was discussed but no decision was reached. The question will be left to the board of directors, who will chose a place of meeting some time during the next three months.

New York's Great Road System.

The state of New York has outstripped all other states on the good roads question. It has a system of maintenance that is almost perfect and a fund is provided that increases every year the mileage of good roads in the state. Few persons realize the enormous amount of money required to keep the roads of New York state in repair, and few people realize the enormous mileage which the Empire state boasts. Frank D. Lyon, the deputy commissioner of the state highway department, has furnished statistics and information on this subject which are not only startling and surprising, but vastly interesting to motorists and good roads advocates in general.

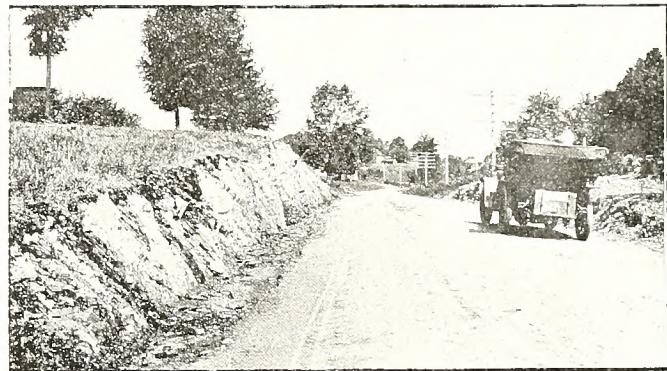
There are in the Empire state 80,000 miles of roads, a greater mileage of which is improved highway than all the other eastern states put together, not including Massachusetts. There are now 2,000 miles of state roads and more under construction. There are macad-

am roads totaling in mileage 2,400, constructed by towns. There are more than 40,000 miles of earth roads, properly shaped and crowned stones picked and removed, depressions filled, culverts and bridges repaired. Towns have constructed 1,000 miles of gravel roads, in first-class condition.

To keep these roads in good navigable shape means work, systematic, untiring labor on the part of a great corps of people. The state is divided into nine districts, with Mr. Lyon in actual charge of these. Each district has a superintendent, an assistant to Mr. Lyon. Then the state is again subdivided into forty-four counties under the supervision of fifty-four superintendents, who in turn are answerable to the nine assistants of Mr. Lyon. Then it is further subdivided into 934 towns, under 934 town superintendents. By this system Commissioner Lyon can reach within twenty-four hours after notification any road in the state in need of repair.

Work of construction and repair is now at its height, and Mr. Lyon's report of recent date showed that on one particular day there were 26,000 men and teams on the roads of the state.

Co-operation on the part of automobilists with the state authorities is urged by the state highway depart-



Gravel with trap screening surface, Seymour Road, looking West. New Haven, Connecticut

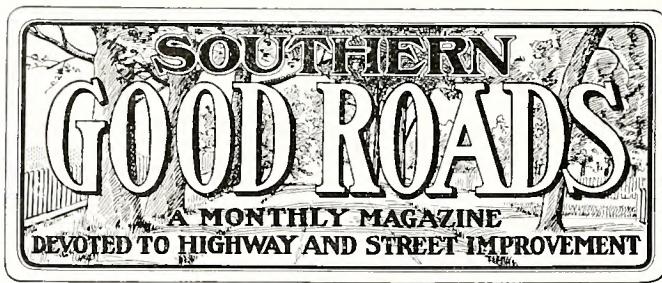
ment. Mr. Lyon asks that tourists running across anything wrong with the roads immediately report the same to him. In this way tourists—those who are actually using the roads—will not only aid the state, but themselves, in keeping the highways in the best of condition.

"The upkeep of motor cars," says Mr. Lyon, "will this year be reduced 40 per cent. in my mind, on account of repairs to highways being made."

Towns are this year raising by taxes for highway improvement the sum of \$2,504,675.23. The state is turning over to the towns to aid them in this work \$1,593,070. Bridge work during the year 1911 is to cost \$628,414.63. The amount to be paid out for new machinery is \$180,011.25. Special road improvements in towns of the state are to cost \$279,706.22, making in all \$5,185,877.33 to be expended by towns this year.

The state is to bond itself for \$19,000,000 for the construction of state roads. Towns and counties are to be called upon to provide as their share \$5,000,000. The state legislature has appropriated \$1,800,000 for the maintenance of state roads already constructed.

The sum of \$21,985,877.33 is to be expended in one year for road construction and improvement throughout the great Empire state—that is, this amount is available for the work, and in all probability will be utilized by the state department of highways.



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Official Organ of the South Carolina Good Roads Association

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VOL. IV.

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\$44,000,000.

During the year that ends with this month, fifteen southern states spent \$44,000,000 in road-building. Does that mean anything to you?

Hon. James Wilson, secretary of agriculture, says that the south leads the nation in the building of good roads. Is not that high praise?

When we come to consider the fact that less than a decade ago this same section was spending less than a million dollars a year for roads, this record is the more remarkable. And we haven't begun to fight yet!

The south is just coming to realize the fact that the only kind of road that we cannot afford to have is a bad road. The south is just beginning to recognize the fact that the building of a permanent road is not an expense, but an investment of the dividend-paying variety.

With these two facts in mind the south has started in the right direction. She has come to realize that the trend of empire is toward her and is determined, as The Atlanta Constitution says, "to meet it half way."

The people of the south are awake. Within a few brief years they have learned that they can manufacture cotton goods in the south as well as the people of New England can. They are no longer dependent

on outsiders for the necessities of life. Economically, industrially, agriculturally the south is one hundred per cent better than it was a decade ago, and the movement for good roads is but a natural outgrowth and accompaniment of the progress that has been made in all lines.

Here is the roll of honor:

Texas	\$7,600,000
North Carolina	4,505,000
Virginia	4,004,000
Tennessee	3,900,000
Alabama	3,484,000
Mississippi	3,130,000
Georgia	2,500,000
Kentucky	2,500,000
Arkansas	2,450,000
Maryland	2,250,000
West Virginia	1,625,000
Oklahoma	1,505,000
Florida	1,505,000
Louisiana	1,132,000
South Carolina	1,100,000

While the south has more than doubled its yearly expenditure for good roads since 1904, the remainder of the country has increased but 70 per cent. The \$44,000,000 spent this year is more than 30 per cent of the entire amount spent for good roads in the nation.

The South is all right.

THE FEDERAL AID QUESTION.

Ninety-nine times out of a hundred, when you read an Associated Press story, you get the "straight of the matter" and you can bank on what that great organization sends out. But, even "Homer nods" and the Associated Press falls down occasionally, as it did in reporting the great Richmond convention last month.

The stories that went out from Richmond during the meeting were not up to Associated Press standards in any particular and they were especially "off-color" in regard to the question of federal aid in road-building. There was some difference of opinion among the delegates as to the proper way to go about securing federal aid and the amount of appropriation that should be asked for, but there was no rioting and disorder in the convention hall or in committee room and there were no delegates rushing about the Jefferson Hotel auditorium, wild of eye and with hair dishevelled. There were no bitter and acrimonious speeches, no charges of dirty work and no references to the opening of "good roads pork barrels." The Associated Press story would lead folks to believe that the convention was stormy indeed, but no such condition existed.

At the very moment when the committee was supposed to have been scrapping bitterly behind closed doors, the convention itself was endorsing federal aid. A resolution asking for federal aid passed the convention by a rising vote, absolutely unanimously. When the committee appeared later with its formal resolu-

tion it was announced that the vote in committee stood 7 to 2. Out of 800 delegates to this great congress of road enthusiasts, only two votes were registered against federal aid!

We regret that the impression went out from Richmond that there was lack of harmony in the convention and we regret, too, that it has gone abroad that there is any break in the ranks of the great army of good roads advocates, who have been fighting gamely for federal aid for so many years. The story gave every opponent of the idea from the Atlantic to the Pacific and from Canada to the Gulf an opportunity of putting in a word against it, and they did not fail to take advantage of it. One and all they have declared that when Uncle Sam begins to build roads, states and communities will cease and their money and time will be spent in lobbying before congressional committees, spending the energy now spent in building roads in a fight for public money. Rot.

Those who stand for federal aid in road-building do not ask that the government bear all of the expense of road-building. They would have the government help only those states which are helping themselves. For every dollar that Uncle Sam would put up for road-building, the state receiving it would be required to invest a dollar in the work, and so on down to the county and to the township, helping only those communities that help themselves.

The state aid plan has been adopted in a number of states and it has worked admirably. It has stimulated interest in road work and has aroused the very deadliest of communities in all parts of the nation. Contrary to the prophesies of those who said that such a system would lead to all sorts of graft and corruption and put an end to active local road work, it has worked just the other way, and the state aid proposition is now sweeping the nation. There are but few progressive states in the nation today that do not have it in some form, and even these will be in line within a year or two.

Now, if the principle will work without graft and corruption attendant upon it in individual states, we believe that it will work in the nation. In this day of the automobile, the people of New York use the roads of Massachusetts, New Jersey, Pennsylvania and even Florida, Georgia, North Carolina and other southern states. As time passes and the automobiles grow more common the interest of New Yorkers in North Carolina roads and of North Carolinians in New York roads, will grow and people will begin to realize that it should be a part of the burden of all of the people to pay for them.

Federal aid is coming. That was the sentiment of the American Association for Highway Improvement in convention at Richmond last month and the triumph of the idea is as certain as anything mortal can be.

Baltimore county, Maryland, has voted a good roads bond issue of \$1,500,000.

The Woman's National Old Trail Roads Association.

A movement initiated by Miss Elizabeth Butler and other women of the Missouri Daughters of the American Revolution has resulted in the formation of the Woman's National Old Trail Roads Association, the first national good roads association to be composed exclusively of women. Their object is to make permanent the system of pioneer roads between the Atlantic and Pacific coasts. It is planned to make the proposed national highway a project in which every woman in the United States will be interested.

The national highway will start at Washington, D. C., and connect with Cumberland, Md., by the Bradock's road. From there to St. Louis, Mo., the route will be over the Cumberland road or National pike. Boon's Lick road will connect St. Louis with Franklin, Mo., when the route will follow the old Santa Fe trail through Kansas City to Santa Fe, N. M. There will be two routes to San Francisco. One, the Southern, over Kearney road, through Phoenix, Ariz., and Monterey, Cal., the other, the Northern route, will lead from Gardener, Kans., to Fort Hall, Ida., and finally to San Francisco. A third route may be established from Fort Hall to Olympia, Washington, over the old Oregon trail, made famous of late by Ezra Meeker of Portland, whose ox team drive over it was a picturesque event in 1906.

Miss Elizabeth B. Gentry was elected president of the new association; Mrs. Mark Salisbury secretary, Mrs. John Van Brunt treasurer. Mrs. Hunter M. Merriweather was delegated to draw up a constitution and by-laws. Vice presidents will be appointed in every one of the forty-eight states of the union. They in turn will organize county associations.

How to Start Something for Good Roads.

First, get two or three "live wire" men together. Don't bother with anybody that takes unnecessarily long to say "Yes" or to say "No." Recommend the taking of action to hold a good roads conference in your town for the purpose of stirring up a healthier and more definite advancement in your highway improvement problems.

Second, have a special meeting of your chamber of commerce or your automobile club or any progressive business men's organization. If you have no organization of any kind get three or four friends together and form a temporary good roads league. Propose the idea of holding a good roads conference in your county. Learn what can be done financially. Discuss what ought to be done. Decide what you will undertake. Stay with it. Then give all the facts to the newspapers. Keep them posted at every future step. They are 90 per cent. necessary to make a success of your meeting. Start it quick.

The American Road Builders' Association in session at Rochester, N. Y., last month, saw actual road work being done on the city streets. Several different kinds of roads were being built. The association was in session four days and the entire time was devoted to practical problems of road construction. There were nearly 1,000 delegates present from all parts of the United States and Canada.

The Trans-Mississippi Commercial Congress in session last month at Kansas City, Mo., passed a resolution asking congress to appropriate funds to aid in the building of good roads.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

The Alabama Good Road Association, which met at Selma last month had a most interesting and profitable session; most of the time was taken up with discussions of various good roads problems, but before adjournment a resolution was introduced calling upon the next legislature to issue \$50,000,000 bonds for highway improvement in the state. Mr. John Craft, of Mobile, was elected president for the ensuing year; the selection of a meeting-place was left in the hands of the executive committee. The Birmingham News says of the convention: "Alabama's Good Roads Convention at Selma, which may be justly accredited to the activity of State Senator V. B. Atkins, member of the state State Highways Commission, demonstrated the wide interest which thinking people all over Alabama are taking in the subject of highway improvement."

Visionaries were there with their dreams and practical men of affairs with their ideas as to how the greatest good may be accomplished, and the net result is a determination on the part of all good roads enthusiasts that the public highways must be improved; the only division of sentiment being on the question of the best method of procedure."

* * *

Georgia.

Savannah is rejoicing over a projected change in the National Highway which will put that city on the route. It is said that the officials of the American Automobile Association are dissatisfied with the present route by Atlanta, through the foot-hills of the Blue Ridge on account of the wretched condition in which the Glidden Tourists found the roads through that section. The eastern part of Georgia is sandy and level, and the roads are said to be much better, especially in the winter time; so a scouting party has started from Savannah to map out a route to Jacksonville, which will follow the coast-line, joining the present highway at Charlotte. This, of course, would not be the official "National Highway" for that runs from New York to Atlanta, having been promoted by the New York Herald and the Atlanta Journal, but it would be a much-travelled and popular road, especially for northern tourists going to Florida for the winter.

* * *

Iowa.

When things go wrong and the future looks black, good roads boosters should think of Senator Lafe Young, of Iowa, and take heart. Less than three years ago he was a lone voice, "crying in the wilderness" and now Iowa is full of good roads advocates from river to river.

In the fall of 1909 the highways in Iowa were the worst in the world, or at least the people thought they were. They were afraid of taxation, they could not see how they could stand any increase of their burdens of this sort; but when Lafe Young raised the cry, "The Best Dirt Road that can be made by draining and dragging, without additional taxation," they all "came in on the hit." Governor Carroll called for a

convention of those who were interested in the subject and 2,000 delegates flocked to Des Moines, and a plan of building a road from river to river was adopted. The plan was based on the road officers of an unbroken line of townships from one side of the state to the other, improving and maintaining the section of road lying inside their several township borders; live men were secured in each county, with the result that "before you could say Jack Robinson" the thing was done. Farmers living along the road agreed to drag the highway after every rain and receive under the state drag law the sum of 50 cents the mile traveled by the drag. Grades were built up, wet places were drained and hundreds of road drags were set to work, and Iowa has to day one of the best highways in the country. It is, as has been noted in Southern Good Roads, 380 miles in length, and passes through Des Moines, the state capital, a dozen cities with a population of from 5,000 to 25,000, thirty small towns and villages and immediately on the line of the road, or within easy reach of it, there are over 20,000 farm-houses.

* * * Kentucky.

According to the statement of the Department of Agriculture, Kentucky spent \$2,500,000 for good roads last year. Considering the area of the state and the percentage of roads already improved, this showing compares favorably with those of the other southern states. Nevertheless, some, at least, of the Kentuckians are not satisfied; they regard the present system of expending the money raised for good roads as dangerously loose. An effort will be made to get the next legislature to take up the matter, and institute a thoroughly modern highway department, vested with the necessary power to see that the funds are expended for the benefit of the roads and not for the enrichment of the contractors. If she does this, Kentucky will be wiser than many of her sister states; beyond a doubt, the thing that has hindered the progress of the good roads cause in this country most, is the unwise expenditure of the public funds raised for highway improvement. It does the cause less harm in the end to have the money stolen outright, than to have it frittered away in foolish and ignorant experimenting.

* * * Louisiana.

Too much praise can hardly be given the good roads enthusiasts of Louisiana for the good work they have done in that state during the past two years. Several hundred miles of really first-class roads have been built and a great deal more is under construction today. One of the strongest forces behind the movement in Louisiana has been the Picayune, one of the liveliest and most influential papers in the south.

Through the untiring efforts of this great paper and others in all parts of Louisiana, the state has awakened to the great necessity of good roads.

Doubtless the advent of the automobile has had much to do in giving the great desire for improved highways that exists. Governor Jared Y. Sanders, who

has earned for himself the sobriquet of "the good roads governor," has been indefatigable ever since his installation into office to push to its limit the perfection of road building in Louisiana.

That the governor has been ably seconded in his endeavors is given full proof by the work that is planned by the state engineers for the laying out and making of excellent thoroughfares the length and breadth of the Pelican state.

The Picayune, from the beginning of the campaign, has done everything it could to promote the good work. The recent New Orleans-to-Memphis good roads tour, has given to the people of the south an object lesson from which they are sure to profit, for the tour proved in every way a marked success, and was the keynote of a sure crusade against impassable roads.

* * *

Mississippi.

If Mississippi has one citizen that it is proud of, that citizen is John Sharp Williams, a democratic leader in the senate of the United States. Last month at a good roads meeting held at Yazoo City in honor of the Memphis-Delta tourists, who were mapping out a highway from Memphis to New Orleans, he made a speech and he came out for good roads in a way that delighted the good roads enthusiasts who heard him. He will be an able ally in the United States Senate for Senator Simmons, Senator Swanson, Senator Cullom, Senator Bankhead, Senator Gallinger and the other live wires of that august body.

In his speech Senator Williams analyzed the result of good roads. He declared the purpose in building good roads could not be said to be confined to mere commerce. He pointed out that if the country had good roads, there would be more churches, easier to reach, which would encourage farmers to attend oftener; that the school attendance in the rural districts would be better attended and the intelligence and morals of the people raised to higher standards. He declared railroads are now crying for good highways, realizing they are the best feeders they have, whereas railways formerly were the cause of so many bad roads. He concluded by wishing success to the movement all over the country, and especially in the Delta, stating good roads are not only exponents and indicators of intelligence and higher morals, but are increasers and upbuilders of higher morals and intelligence.

* * *

Missouri.

The beginning of a "Five Hundred Good Roads Club" was made at an enthusiastic meeting of Joplin business men last month. At the close of a three-hour session, during which some fifteen road boosters addressed the gathering, a resolution, looking to the promotion and early termination of the Kansas City-Joplin-to-Arkansas rock pike, was unanimously adopted. The roads committee, of three members from the Commercial Club and the three commissioners of the Joplin special road district, were given endorsement of their work in the past and an urgent appeal to continue the movement which now seems started.

Governor Hadley has promised to soon begin an agitation for legislation to put the convicts to work on the roads of the state.

* * *

Oklahoma.

The good roads convention which was held in Muskogee last month not only was the beginning of a state

road north, south, east and west, but brings about the possibility of a macadamized road between Muskogee and Kansas City joining the two cities by a road through the richest territory in Oklahoma, Arkansas and Missouri.

President McNabb of Washington county, Arkansas, guaranteed to meet the Oklahoma state road at the Arkansas line with a macadamized road which would be its equal and directly connect Muskogee with Kansas City. President McNabb stated that the road from his county through Missouri was already in fine shape all the way.

In connection with the good roads convention was the resolution offered by M. E. Springer from Oklahoma City, asking that the delegates adopt the resolution asking that the National convention be brought to Oklahoma City in the year of 1912.

* * *

Tennessee.

Tennessee is rapidly coming to take her rightful place in the forefront of the southern states in the matter of highway improvement; county after county is agitating the matter, issuing bonds or appropriating money in some other form, and, as is always the case, the more model roads are built, the more the fever spreads.

The Tennessee Association for Highway Improvement has been granted a charter of incorporation by secretary of State Hallum Goodloe, the objects of the organization being to promote the improvement of roads generally over the state, the publishing of maps and the shaping of good roads legislation. The organization will co-operate with the aims and objects of the Memphis-to-Bristol Highway Association, but will not limit its work to any one road.

The charter was granted under the general welfare clause. This is a step forward for Tennessee, for, if it is wisely managed, a state association can wield a greater influence than half-a-dozen local organizations, all pulling in different directions.

* * *

Texas.

A movement has been inaugurated to beautify the Galveston-Houston highway by planting shade-trees along the route; it should not be a difficult matter to make this one of the most attractive highways in the United States, as it runs through perhaps the most prosperous section of Texas. The Galveston News, commenting editorially, says: "Some day all the land between these two cities will be devoted to small fruit and vegetable farms and the population along this road will be almost urban in character. It is proper that this day be hastened in every reasonable manner, and to this end there is no one thing that will contribute more than beautifying the road that traverses it. In addition to the highway for wagons and automobiles that is to be ready for use with the opening of the causeway the Galveston-Houston interurban railway will also be in operation between these cities and will be a great factor in the development of the section."

J. W. Warren, of San Antonio, president of the Bexar county Highway League, went to the good roads convention at Dallas in his motor car, and returning made the run of 303 miles in eleven hours and twenty-six minutes. Few states have a stretch of highway of that length over which such time could be made; it speaks well for Texas roads.

Virginia.

At a meeting at Bristol last month it was decided, in view of the approaching elections, to postpone definite action looking to the securing of a good roads election in the various counties to be touched by the proposed Bristol-Roanoke highway. It was feared that the question might be dragged into politics, which would spell ruin to the projected highway. All the representatives present, however, reported a healthy sentiment in favor of the construction of the road all along the line. An effort will be made to have the next legislature grant to the various counties such privileges as may be needed with reference to the issuing of bonds, or making appropriations in other forms. The survey will probably be made by the state highway commission and the counties will thus be supplied with specifications which they may use in the actual construction of the road.

* * *

Washington.

The northwest is alive to the value of good roads. In a recent issue of the Seattle (Wash.) Intelligence the statement is made that before the road-building season is over Seattle and Tacoma will be connected by a first-class macadamized highway. In King county, of which Seattle is the seat, there is \$320,000 available, including state aid, for road improvement this year. Much of this will be spent on a trunk line destined to connect Seattle and Everett. From Everett to Tacoma an improved road is a matter of the near future. This road work is part of a general plan to build a trunk line from the northern to the southern boundary of Washington, which in turn will become part of a highway from the Great Lakes to the ocean, through the northern part of state, and this will connect with another trunk line from British Columbia down the coast to Mexico—a dream of that wide-awake country that is certain to be realized in the next few years.

GOOD ROADS NOTES IN BRIEF

The Bexar county, Texas, fair gave a day to featuring good roads.

The people of Montgomery county, Tennessee, are determined to have good roads. They are not only raising money by private subscription, but the farmers are offering their teams and drivers free of cost to the road commissioners.

Oklahoma wanted the next convention of the American Association for Highway Improvement; every delegate to the Richmond meeting was instructed to use his best efforts to bring the Congress to Oklahoma, and did so.

Jeff Davis county, Georgia, has appointed an additional road commissioner and is considering a big bond issue for highway improvement.

Crisp county, Georgia, is considering a good roads bond issue of \$200,000.

The election in Franklin county, Alabama, to decide whether to issue \$125,000 good roads bonds has been postponed until February.

Nebraska City, Nebraska, has a troupe of amateur minstrels, all of whose receipts go to help the good roads movement.

Jackson county, Florida, has disposed of \$100,000 worth of her good roads bonds, and construction work will begin at an early date.

Duval county, Florida, will open bids December 29th, for paving John Anderson highway from Loretto to the county line. It will also pave a portion of Atlantic boulevard with asphalt macadam and vitrified brick.

Monroe county, Tennessee, is preparing to construct 157 miles of good roads.

Norfolk county, Virginia, will construct a road from South Norfolk to Kempsville.

St. Lucie county, Florida, has voted \$200,000 bonds for road improvement.

The city of Magnolia, Mississippi, has voted \$12,000 bonds to construct sidewalks.

Anderson county, Texas, has voted bonds for road improvement to the amount of \$150,000.

Caney township of Osage county, Oklahoma, has voted \$40,000 to improve her highways.

Pilot Point, Texas, has voted \$12,000 for street improvements.

Calhoun county, Alabama, has awarded a contract to construct a road from Cane Creek to Jacksonville.

The city of Austin, Texas, has awarded a contract to pave the drive in the Capitol grounds with bitulithic.

It is possible that Washington county, Pennsylvania, will before long have the most remarkable system of county roads in America. They build their roads of brick, up there, twelve feet wide, with a concrete curb; the average cost is a little over \$20,000 a mile. Petitions were presented to the grand jury recently, asking for roads whose total cost is estimated at \$652,000! And nobody fainted either.

The people of South Dakota are congratulating themselves on the fact that their roads "froze up smooth;" that is, the first frost struck them when they were dry and in fairly good condition. They will probably remain frozen now until spring, which means that the state will have good roads all the winter.

Lawrence county, South Dakota, is spending \$20,600 on a 4-mile stretch of road, reducing the grade from 20 to 6 per cent, just to show what it can do in the way of road-building in the dead of winter.

Houston Heights, Texas, will spend \$180,000 improving her streets.

The industrial department of the Missouri, Kansas & Texas Railway Company of Texas has caught the agricultural habit. Beginning December 4, Thomas L. Peeler, industrial agent of the company, will chaperone a "Farming and Good Roads" special out of Houston for a tour of all the company's lines in Texas. With the train will go several of the experts from the faculty of the Agricultural and Mechanical College, Prof. Potts among the number.

Emanuel county, Georgia, has caught the good roads fever sufficiently strong to use all its own misdemeanors or convicts on its roads, and all of the state's felons that it can get. A few years ago there were only two or three automobiles in the county; now there are more than 50.

Austin county, Texas, offers for sale \$175,000 worth of road bonds.

East Chattanooga, Tennessee, has formed a good roads club for the purpose of boosting the cause in that immediate neighborhood.

Reeves county, Tex., will vote Jan. 19, 1912, on a bond issue of \$200,000 for good roads.

The city of Fort Worth, Texas, is paving two streets with vibrolithic.

Richmond, Virginia, has appropriated \$2,290 for paying a portion of Belvidere street.

The city of Crystal Springs, Mississippi, will pave five miles of sidewalk with concrete, at a cost of about \$25,000.

The high school boys of Minneapolis were excused from school one day last month to take a census of traffic on the 32 roads leading into the city. Every teamster signed a report stating the value of his load, its weight, and the number of miles hauled. The statistics will be turned over to the local good roads association.

The entire board of commissioners of Galveston county, Texas, made a tour of inspection over the highways of their county recently. They report the roads in gratifyingly good shape.

Benton county, Arkansas, has purchased modern road machinery and had a highway commission appointed. They mean to have the best system of roads in the state before they quit.

In a brief dispatch from Hampton, Tenn., telling of an election to fill a county office made vacant by a resignation, appeared the following: "L. D. Gastiger defeated Ed Wagner by a large majority. Wagner was opposed to bonds and good roads." The steam roller will get them all in time.

Strike-Axe township of Osage county, Oklahoma, has voted a \$30,000 bond issue for road improvements.

Chester county, South Carolina, has awarded contracts for the construction of sand-clay roads.

Little Rock, Arkansas, has appropriated \$28,000 for street improvements.

A good roads association has been formed in Carroll county, Arkansas, with A. O. Fain, of Eureka Springs, president and B. B. Eslinger of Berryville secretary. The first work of the association will be the building of a first class road from Eureka Springs to Rogers.

Mr. M. O. Eldridge, of the U. S. Office of Public Roads, addressed a goodly assemblage of good roads people at the Emerson Hotel in Baltimore last month. The main purpose of the meeting was to boost the movement for improving the road between Perryville and Elkton on the auto route to Philadelphia.

The state of Kansas has a very strict good roads law. It requires the systematic dragging of all dirt roads and provides for the arrest and heavy fining of the road supervisor who fails to carry out the law.

At Diller, Neb., last month a good roads banquet was held. Three hundred boosters enjoyed the spread.

There were several meetings in Boone, Carroll and Searcy counties, Arkansas, last month, boosting the building of a section of road which is to compose a part of Arkansas' Great White Way. A road is to be built from Harrison to Gaither Mountain.

A meeting was held at Herington, Kansas, last month to plan a short cut highway across the state, running from Olathe, Kans., to Lyons, Kans. The road will follow the old Santa Fe Trail very closely and will be 50 or 60 miles shorter than the cross-state highway through Emporia and Hutchinson between the same points.

Henry county, Tennessee, will build by private subscription, a road from Cottage Grove to Paris, at a cost of \$20,000.

Byromville, Ga., has voted bonds to the amount of \$1,400 for street improvement.

The recent election in London county, Tennessee, on the question of issuing \$100,000 good roads bonds, resulted in a victory for the bonds.

Montgomery county, North Carolina, will vote in January on the question of issuing \$100,000 bonds for good roads.

Jefferson county, Alabama, has awarded a contract for grading a road near Oak Grove.

The city of Memphis, Tennessee, has awarded a contract for the construction of a gravel roadway on Arkansas Avenue.

Mount Holly, North Carolina, has awarded a contract to construct sidewalks in the business section.

The city of Pine Bluff, Arkansas, has awarded a contract at \$60,000 for paving two streets with creosoted blocks.

The Corinth, Shiloh and Savannah Turnpike Co. has been incorporated in Georgia with a capital of \$25,000, to construct a road from Savannah to Alcorn, Miss.

The St. Louis, Missouri, Board of Public Improvements has approved bills for street improvement to the amount of \$171,560.

A new idea in road-building was originated by the Manhattan, Kansas, Motor Club last month. On the appointed day practically the entire population of the township turned out at sunrise, and under the leadership of twelve team captains, worked on the roads till sundown. Lawyers, doctors, merchants, bankers—all classes of citizens set to with a will, and when night fell one hundred miles of road around Manhattan were in perfect condition.

With the beginning of work on a north and south road, Washington county claims to lead the state of Oklahoma in good roads work.

The roads of Wisconsin will receive about \$100,000 from the new tax on automobiles and motorcycles. The automobile license has been raised from \$2 to \$5, and the motorcycle tax from \$1 to \$2.

The Pauls Valley Commercial Club is endeavoring to have an election called to vote on a proposed bond issue of \$250,000 for road improvement in Road District No. 1.

42,280 miles is the Manufacturers' Record's estimate of the extent of road improvement in the south since the movement started in 1904.

Colorado has had the misfortune to have a good roads bill that passed the house, and was supposed to have passed the senate, held up by the court on account of the scheme of some rascal who destroyed the senate record of the aye and nay vote.

A good roads rally held recently at Dinsmore, Fla., aroused great enthusiasm. As a result of the meeting a lively campaign is now going on for the construction of a twenty-five mile boulevard.

The ninth district of Baltimore county, Maryland, is going after her share of the state good road bonds. The residents of that district claim that in the recent distribution of \$5,000,000 they were slighted.

In the five states having the best roads the average school attendance is 77 per cent of the enrollment; in the five states having the worst, the attendance is 69 per cent. It all points to the same moral that the good roads enthusiasts have been endeavoring for years to beat into the heads of their fellow-citizens—good roads mean education and progress; bad roads mean ignorance and retrogression.

Near turns in the roads of the west white bands are painted on the trees, telegraph poles and other conspicuous objects. Twenty rods from railway crossings red bands eighteen inches wide are painted on telegraph or telephone poles, or on posts especially set for that purpose.

The Golden Belt Highway Association has been organized at Abilene, Kansas, for the purpose of building a model motor highway from Kansas City to Denver.

The people of the sixth district of Hamilton county, Tennessee, have organized a club for the purpose of apprising the authorities of every break in the good roads in their section. Every time the road shows signs of weakening they promise to torment the road commissioners relentlessly until the bad place is mended. If the organization does not go to sleep Hamilton county will have brag roads from now on.

Washington county, Pennsylvania, has already issued \$500,000 worth of good roads bonds, and now they are contemplating adding another half-million to that. The estimated cost of one 16,000-foot stretch, which they are preparing to build along the Monongahela river, is \$334,317.

Muddy roads broke up the great automobile parade scheduled for the Good Roads Day at the International fair at San Antonio, Texas.

Tallapoosa county, Alabama, has received the new road machinery ordered some time ago, and is now prepared to make the dirt fly.

About twenty citizens of Enid, Oklahoma, took a day off last month, and put two miles of road leading out of the city in first-rate shape.

John Clark Seates, who is attempting to qualify as the next democratic candidate for governor of the state of Maine, will if nominated, run on a good roads platform. The progress of his campaign will be watched with much interest throughout the country.

The Missouri members of the Daughters of the American Revolution have formed an interstate good roads association in the interest of the ocean to ocean highways.

Missouri can boast of an across-the-state highway that can be traversed by an automobile any day in the year. How many southern states can say as much?

St. John the Baptist parish, Louisiana, is preparing to add another link to the New Orleans-Baton Rouge highway.

Says the New Castle, Pa. News, "the condition of its roads is coming to be regarded as a fairly reliable index to the character of a community. Bad roads are accepted as proof of unprogressiveness just as much as good roads are looked upon as evidence that the people of that particular section are wide awake."

Postal inspectors have been going over the roads in Iowa and where the highways are in bad condition and neglected, they are clipping a mile or two off the R. F. D. routes. A more effective way of boosting good roads has never been hit upon.

To lose the public roads of a county is a loss whose possibility may at first be doubted, but that is exactly what Shawnee county Kansas has done. No records have been kept of the location of roads for the past twenty-five years, and now nobody knows where they begin or end.

The San Antonio-Port Lavaca Highway Convention, held at Cuero, Texas, November 17th, was very well attended and got down to business at once. Plans and specifications were produced, and ways and means of financing the undertaking. It is fairly certain now that the San Antonio-Port Lavaca highway is a thing of the not far distant future.

Mr. Thomas Fortune Ryan, the financier, is one of the most enthusiastic good roads advocates in the country. He recently entertained the crew of the scout car that is laying out the new national highway from New York to Jacksonville, Fla., and the scouts left saying that nowhere in the south had they met a more ardent supporter of the cause.

Columbia University, always a leader in the educational world, will open a school of good roads this month. It will be known as the "department of highway engineering" and has been heavily endowed by a wealthy New Yorker who believes that more attention should be given the construction of good roads in the United States.

An advertisement published by the Santa Fe railroad says:

Enjoy your auto in California.

Every road a royal highway.

Today California has a superb system of highways, state built, and costing millions. You can drive hundreds of miles safely, swiftly, comfortably.

How many Southern states are being advertised all over the nation that way? They all might be, if they all were as wide-awake on the good roads question as California.

A complete highway system for the state of Mississippi has been outlined and will be presented to the next session of the legislature. It includes two great north-and-south highways, one on each side of the state, and several connecting roads.

Since the Milwaukee-Oconomowoc highway was built in Wisconsin last summer, farm lands along the route have risen in value \$5 per acre.

The Maryland State Roads Commission is spending \$45,442 to improve a section of the Baltimore-Annapolis boulevard.

Covington county, Mississippi, has awarded contracts to build and maintain roads in Beats 1 and 2.

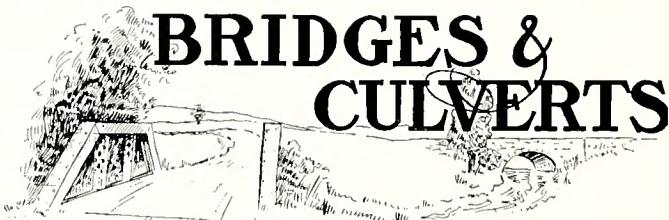
Dallas, Texas, has awarded contracts at about \$13,000 to pave two streets, one with wooden blocks, the other with bitulithic.

Lincolnton, North Carolina, is constructing 2,000 linear feet of sidewalks, and 2,000 linear feet of curb.

Memphis, Tennessee, is spending \$26,800 in paving.

New Decatur, Alabama, has awarded a contract for sidewalk construction at \$5,200.

The city of Pine Bluff, Arkansas, has awarded a contract at \$57,962 for paving 16 squares with creosoted blocks.



Chaithead county, Arkansas, will build a bridge over the St. Francis river, at a cost of \$50,000.

Mobile county, Alabama, will build a bridge over Dog river.

Kansas City, Missouri, has awarded a contract at \$10,565 for the construction of a bridge over Brush Creek at Wornall Road.

The Board of Public Improvements of St. Louis, Missouri, will erect bridges and viaducts within the city to cost altogether about \$470,000.

Wise county, Virginia, has given a contract, at \$24,000, for the construction of 26 bridges.

Hanover county, Virginia, will build a bridge across the Chickahominy.

Fruit trees are planted along the sides of the roads in Germany. Along certain stretches of road the yield from these trees amounts to nearly \$600 per mile annually.

Why the Motorist Does and Should Work For Good Roads

By MR. A. G. BATCHELOR, Chairman A. A. A. Executive Committee

That man who uses a public utility in greatest degree is naturally the one to concern himself most thoroughly in matters relating to its satisfactory conduct. Highways are for the general public, for even those who do not drive vehicles are benefitted by a good road, in that enables those who serve them to do so more effectively. Furthermore, one must always keep in mind the fact that it is the consumer who pays the toll; all the tolls resulting for bad roads are a substantial waste of money that can be profitably employed otherwise.

But it follows as a natural sequence that the man who uses the road most must see to it that there is proper construction and adequate maintenance. Hence it is that the duty is devolving upon the owners of motor-driven vehicles, for the simple reason that their average per day and per month and per year is greatly in excess of that of any other road user. If one passes over a bad stretch of road every day in the week, he is likely to interest himself more with its improvement than is the person who drives into town and back once in a week or ten days. The motorist is a persistent user of the road, where the horse owner comes along somewhat occasionally; and it should be noted that even in driving his car within reason, the motorist travels at greater speed, and a poor road means more discomfort to him than to the man who proceeds more leisurely. In this time-saving age, one who refuses to adopt improvements is not keeping pace with the procession. If it is perfectly logical, in order to take advantage of a time-saving vehicle, that there is need of bringing the public highways up-to-date, it is certainly a disregard of economies not to meet the changing conditions.

Charged by some with a selfish purpose only in his work for highway improvement, the motorist at once responds that good roads are for everybody. Even the wide-awake farmer recognizes this fact, and a good example of many such is Tom McKay of Kansas, who recently spoke in this strain at a farmers' institute held in Oberlin:

"Some of us farmers are standing in our own light. We argue that we should not build good roads for motor cars to travel over. I have no motor car, but it seems to me that a road that is good for a motor car is good for a farmer to haul a big load of wheat over, or for me to drive my surrey over to take my family to town. We are too afraid that we will do something which will benefit some one else, and, in fact, we are the losers by our own acts. I have already graded a mile of road along my farm on Prairie Dog Creek. Just to show you people that I desire a good road reaching from the south part of the county, where I live, to Oberlin, I will agree to take my boy and my team, if necessary, and grade another mile of that fourteen miles, if the rest of your business men and farmers living along the road will do your share."

Some of the farmers in attendance wanted to know the cost, and then agreed to do their share if McKay would superintend the job. McKay would not be bluffed, and his fellow farmers supplied their share of the money and the fourteen miles stretch of improved

dirt road was soon placed in travelable condition.

State Geologist Hotchkiss of Wisconsin recently told how a farmer of that state became a believer in Good Roads. An offer of 92c. came in March for a thousand bushels of potatoes which he had been holding for a better market, but, unfortunately, the only way he could get to town, in March, was over the telephone. When the roads dried out he secured 30c. a bushel for his potatoes. Thus he figured that bad roads cost him something like \$600, and he likewise figured that if all the main roads in the county had been improved, his share would have been only as much as the loss on his crop of potatoes.

Believing as he does in motor-driven vehicles, the motorist is firmly convinced that practically all transport over public roads of humans and merchandise will be of the same kind; and so he refuses to be rated thoroughly selfish in his highway improvement efforts. As a matter of fact he expects and is willing to do more than his share towards securing good roads that unavoidably must be of value to the entire community. Furthermore, the motorist is paying in most states actually for the right of using the roads, something which is plainly unconstitutional, and to which he submits because the money itself is invariably used on the roads. If one class of road user is taxed, it is not unreasonable to assume that all road users should pay something, even though the man who covers the greater mileage should pay in proportion to his greater use of the road. Only in one state has the constitutionality of the proposition ever been attacked, and that is in New Jersey, and done there principally because of the unreciprocal attitude of that state in its relation to the automobilists of other states.

It has been said that free roads are a necessity in a free country, and during these "tag days" for motorists, who are inter-state as well as intra-state in their goings and comings, there is excellent argument in favor of a federal number to supplement the registration required by the home state. Then the visitor would be noted when in another commonwealth, and if he were unfair in his use of the roads, he could quickly be apprehended. It is manifestly unjust that an entire class should be subjected to persecution because of the acts of a few. In many communities the great body of law abiding motorists are assisting the authorities in weeding out and bringing to justice the small percentage which does so much to prejudice public opinion, and for a time retards the advance of motor-driven transportation.

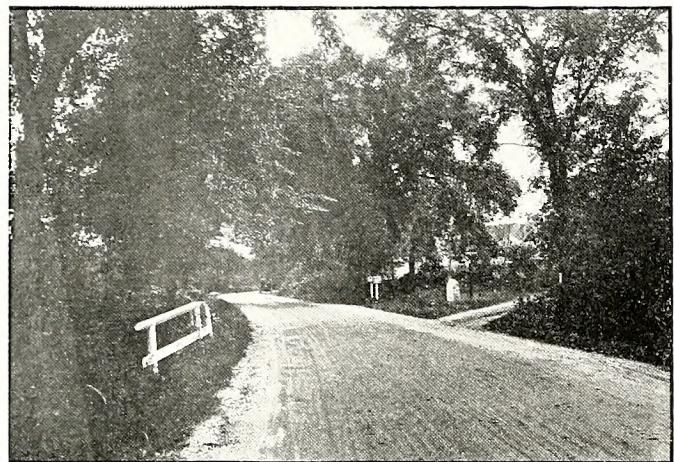
The A. A. A. through its 40 state bodies and 311 clubs, represents in organized form the half-million motor car owners of the country.

President Robert P. Hooper in a recent announcement that the A. A. A. would greatly amplify its good roads campaign had this to say:

"In a few years half the automobiles in the United States will be owned by farmers. Both as an agriculturist and as a car owner many farmers now want good roads, and furthermore, they are willing to pay for highway improvement, whenever they can possibly af-

ford to do so. In some regions, however, they are obliged to spend so much money to get their crops to market over the horrible roads that they cannot compete with the districts possessing better highways. Of course, national and state aid would open these regions, and these are the two things which the A. A. A. stands for and is willing to co-operate with any organizations having similar views."

An economic view relating to the adoption of the motor-driven vehicle is quite concisely set forth by Dr.



Oiled Macadam, Sudbury, Mass.

H. Rowe, president of the Automobile Club of Maryland, in these words:

"There are about one hundred million people in the United States, approximately as many cattle, sheep and swine, and about twenty million horses; so say the government reports."

"A very low estimate of the cost of the feed for these horses is one million dollars annually. If the cereals required to feed these twenty million horses, or say the ten million of them that are used for purposes other than agricultural, and if the hay and other provender required could be turned into cattle, sheep and swine, and their products, and all of this added to the food supply of the hundred million people, it would reduce the cost of living proportionately. Does not this seem to be a solution, in large part, of the greatest of all questions now confronting us—the high cost of living?"

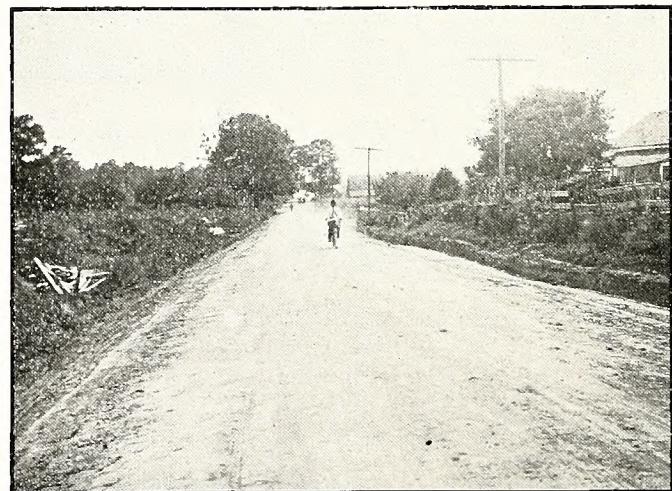
"The motor, in the shape of trucks, delivery wagons, road wagons, traction engines, etc., will eventually do most of the work now done by horses. Any serious contemplation of the situation must convince any one of the great economic change the horseless age will inaugurate. Already, on many of the large western farms the motor is employed almost exclusively and the use of horses has practically been discontinued, and within the next ten years we can expect that a large part of the ten million horses included in the above estimate for agricultural purposes will be eliminated as consumers of food supplies that are required for the maintenance of mankind."

"Up to this time, the motor car for the transportation of individuals has been mostly in evidence. The farm and road tractor, the truck and light delivery wagon, and the other types of commercial vehicles are just coming in. Shortly they will greatly exceed the pleasure car in number and importance."

It may be interesting to give a few instances of what A. A. A. clubs have done in various states, in

order to show how country-wide has become the co-operation between motorists and good roads advocates. In Minnesota a club at Benson brought into town leading farmers as their guests, supplied a highways picture show and other entertainment, and made converts to motor transportation. In Vermont the State Highway Commissioner has no hesitancy in consulting the automobile club of that state at all times. Down in Louisiana the Motor League was responsible for the construction of the Chef Menteur road, which is the best object lesson of its kind in the whole state. In Lenawee county, Michigan, the county automobile association supplied 400 loads of clay to assist in bettering one of the worst sand roads in the whole state. In Idaho the Bannock County Automobile Association joined the national body of motorists in order to secure nation-wide aid in the effort to open up Yellowstone Park to motor-driven vehicles. The automobile club of Southern California has with its own money sign-boarded hundreds of miles of road. In Oregon, the Portland Automobile Club is lending its substantial influence to the building of a road to Mt. Hood. In Nebraska, 20 county automobile associations have been brought into existence almost exclusively for the purpose of aiding in securing state aid and other essential highway legislation. In fact, all over the country the local associations have aided in their own vicinities, besides co-operating with the other clubs of the state bodies, which constitute the national organization.

Federal aid was once looked upon as something indefinite; to be discussed, perhaps, but not to be expected for a generation or more. But the story today is of a decidedly different sort, and when a man of the national capacity of Speaker Champ Clark is willing to put himself on record in this kind of a letter to the Executive Committee of the A. A. A., it would certainly indicate that times have changed. These were



Chert Road, Summerville, Ga.

the words in which the Speaker announced unequivocally his position in the matter:

"I believe the time has come for the general government to actively and powerfully co-operate with the states in building a great system of public highways. I believe the building of the Lincoln Highway would be the entering wedge for the creation of a splendid system of roads that would bring its benefits to every citizen in the country."

But the list does not end with the name of Clark. In the senate such men as Simmons, Swanson, Bank-

head, Cullom, and Gallinger are outspoken in their attitude, while in the lower house one hears of Borland, Sulzer, Hobson and Burnett. Others have in one way and another given evidence of their belief in federal participation, and it is a certainty that this question will not down. It will, require much discussion, compromising in some particulars, and a gradual and concise segregation of all ideas before the subject is reduced to a workable and satisfactory plan.

This laconic utterance of the Shreveport, La., Times, speaks volumes; "While a bad road leads nowhere, and the sooner it ends the better, a good road may lead to anything."

The city of Richmond, Virginia, and the Peninsular Automobile Association together have raised \$7,500 toward the road from Richmond to Newport News.

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Calhoun county, Alabama, in addition to the Cane Creek-Jacksonville road, the contract for which has been awarded, will build a road from Anniston to Alexandria.

Palestine Texas, will spend \$150,000 building sand-clay roads. The bonds were originally issued for the building of macadam, but the voters have been convinced that sand-clay is the better material for that section; that amount it is thought, will build 70 miles.

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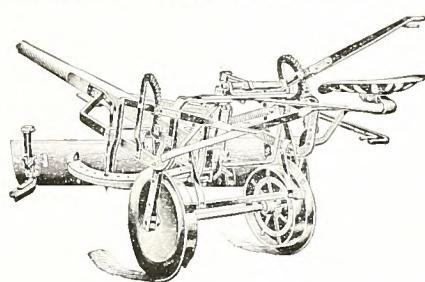
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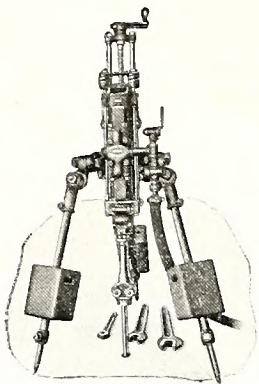
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